Issued September 1969

SOIL SURVEY
Lake County, Tennessee

UNITED STATES DEPARTMENT OF AGRICULTURE

Soil Conservation Service

In cooperation with

TENNESSEE AGRICULTURAL EXPERIMENT STATION

Major fieldwork for this soil survey was done in the period 1963 through 1966. Soil names and descriptions were approved in 1967. Unless otherwise indicated, statements in the publication refer to conditions in the county in 1967. This survey was made cooperatively by the Soil Conservation Service and the Tennessee Agricultural Experiment Station; it is part of the technical assistance furnished to the Lake County Soil Conservation District.

Either enlarged or reduced copies of the soil map in this publication can be made by commercial photographers, or they can be purchased, on individual order, from the Cartographic Division, Soil Conservation Service, United States Department of Agriculture, Washington, D. C. 20250.

HOW TO USE THIS SOIL SURVEY

THIS SURVEY contains information that can be applied in managing farms and woodlands; in selecting sites for roads, ponds, buildings, and other structures; and in determining the suitability of tracts of land for agriculture, industry, and recreation.

Locating Soils

All of the soils of Lake County are shown on the detailed map at the back of this survey. This map consists of many sheets that are made from aerial photographs. Each sheet is numbered to correspond with a number shown on the Index to Map Sheets.

On each sheet of the detailed map, soil areas are outlined and are identified by a symbol. All areas marked with the same symbol are the same kind of soil. The soil symbol is inside the area if there is enough room; otherwise, it is outside and a pointer shows where the symbol belongs.

Finding and Using Information

The "Guide to Mapping Units" can be used to find information in the survey. This guide lists all of the soils of the county in alphabetic order by map symbol and gives the page where each soil is described. It also gives the capability classification of the soil.

Other classifications can be developed by using the map and information in the text to group soils according to their suitability or limitations for a particular use. Translucent material can be used as an overlay over the soil map and colored to show soils that have the same limitation or suitability. For example, soils that have a slight limitation for a given use can be colored green, those with a moderate limitation can be colored yellow, and those with a severe limitation can be colored red.

Farmers, foresters, and game managers can find information about use and management of the soils in the section "Descriptions of the Soils."

Engineers and builders can find under "Engineering Uses of the Soils" tables that give estimates of soil properties and information about soil features that affect engineering practices and structures.

Scientists and others can read about how the soils were formed and how they are classified in the section "Formation and Classification of the Soils."

Newcomers in Lake County may be especially interested in the section "General Soil Map," where broad patterns of soils are described. They may also be interested in the section "General Nature of the County."

Cover picture: Soybeans in a field of Adler silt loam, which is protected by a levee.

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SOIL SURVEY OF LAKE COUNTY, TENNESSEE

BY WILLIAM T. BROWN, W. C. JACKSON, G. L. KEATHLEY, AND C. L. MOORE, SOIL CONSERVATION SERVICE

UNITED STATES DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE, IN COOPERATION WITH THE TENNESSEE AGRICULTURAL EXPERIMENT STATION

LAKE COUNTY, in the northwestern corner of Tennessee (fig. 1), has a total land area of 104,960 acres. The Mississippi River forms the western boundary and part of the northern boundary. Reelfoot Lake is along the northeastern boundary.

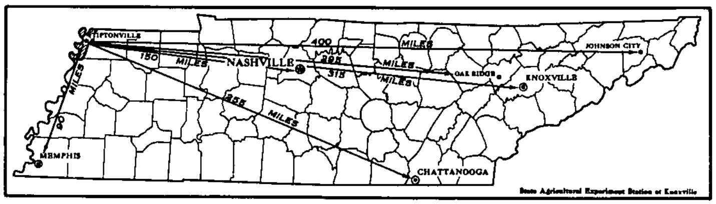

Figure 1.--Location of Lake County in Tennessee.

This county is entirely on the bottom land of the Mississippi River. The elevation ranges from 265 to 280 feet next to the river and from 270 to 310 feet in the eastern part of the county. Some of the most fertile and productive soils in the State are in this county. Flooding and poor drainage are the main limitations. The floods are in winter, so most of the soils dry early enough for spring planting.

About a third of the acreage is not protected by levees and is flooded 2 or 3 weeks nearly every year. In this flooded area, the soils nearest the river generally are sandy and loamy, and those more distant from the river are finer textured. In some low places clayey soils have formed in material that settled from water ponded in old sloughs and former channels.

The eastern two-thirds of the county is protected by levees. It consists of several nearly level ridges, or swells, that are 1 to 3 miles wide and slope gently toward low, broad flats, which are segments of former channels of the Mississippi River. The soils on the swells are silty and loamy; those on the flats are clayey. Water drains readily from the higher areas and collects in low areas, where it remains for several days.

Next to Reelfoot Lake is one low tract of woodland, several thousand acres in size. Much of this area is under water intermittently through the year.

GENERAL NATURE OF THE COUNTY

Lake County, formerly a part of Obion County, was established on June 9, 1870. The area was once heavily wooded with poplar, oak, cypress, walnut, beech, and other trees. Many of the early settlers came here as members of sawmill crews and chose to remain.

In 1960, the population was 9,572. Tiptonville, the county seat and largest town, had a population of 2,068. Ridgely, the only other incorporated town, had a population of 1,464. Among the other settlements are Mooring, New Markam, Phillippy, and Wynnburg.

Agriculture accounts for about 80 percent of the income. Tiptonville and Ridgely are trading centers and also have manufacturing plants. Reelfoot Lake attracts tourists and sportsmen from a wide area and is an important source of income (pl. I).

Lake County has a drainage system in which surface runoff first collects in small streams or ditches and then is carried into progressively larger streams or ditches and finally into the Mississippi River. The numerous drainage ditches that occur throughout the county are mostly natural streams that have been improved. Some of these ditches drain directly into the Mississippi River, some into Reelfoot Lake, and some into Running Reelfoot Bayou, an outlet of Reelfoot Lake.

Agriculture

Farmland takes up 80.4 percent of Lake County. In 1964, there were 222 farms. Most of the farms are between 200 and 499 acres in size, but 10 are less than 10 acres in size, and 57 are at least 500 acres. In 1964, the average size was 387 acres.

Soybeans, cotton, and corn are the main crops. The acreage planted to soybeans has increased greatly in recent years, and the acreage in cotton has decreased. The corn acreage decreased rapidly after machinery began to replace work animals but recently has been on the upturn. Wheat and alfalfa are other important crops. Sorghum, sunflowers, and watermelons are grown also.

Climate [1/]

The climate of Lake County is characterized by fairly mild winters, hot summers, and abundant

[1/] By JOHN VAIKSNORRIS, State climatologist, U.S. Weather Bureau, Nashville, Tenn.

TABLE 1.--TEMPERATURE AND PRECIPITATION

[Data from Tiptonville, Lake County, Tenn. Elevation 295 feet. Station discontinued in May 1942]

Month	Temperature 1,2/				Precipitation 3/			
	Average daily maximum	Average daily minimum	Two years in 10 will have at least 4 days with--		Average total	One year in 10 will have--		Average snow-fall 4/
			Maximum temperature equal to or higher than--	Minimum temperature equal to or lower than--		Less than--	More than--	
	°F.	°F.	°F.	°F.	In.	In.	In.	In.
January----	49.2	27.7	65	8	5.74	1.1	10.0	1.8
February---	51.6	30.2	68	18	3.62	.9	7.0	2.7
March------	60.9	37.1	77	26	4.91	1.6	7.5	.7
April------	71.0	46.0	85	39	4.58	1.5	6.2	(5/)
May--------	80.8	53.9	92	48	3.81	1.0	6.6	0
June-------	89.5	65.8	99	56	3.80	1.1	7.7	0
July-------	92.5	70.1	100	62	4.17	.8	6.3	0
August-----	91.5	68.2	100	58	2.85	.3	5.6	0
September--	85.7	61.4	98	42	3.27	.9	4.3	0
October----	75.0	49.4	92	31	3.15	1.1	5.0	.2
November---	59.0	38.3	82	15	3.84	1.4	5.8	.6
December---	50.0	32.5	72	7	4.22	1.6	6.9	1.2
Year-----	71.4	48.4	6/ 103	6/ 4	47.96	35.7	60.8	7.2

1/ Temperatures were measured in standard instrument shelters of the U.S. Weather Bureau, with thermometers 4.5 feet above ground. On clear, calm nights, shelter-level temperatures are usually about 5 degrees higher than temperatures near the ground and may be as much as 12 degrees higher.

2/ Period of record, 1929-42.

3/ Period of record, 1924-42.

4/ Period of record, 1925-42.

5/ Trace.

6/ Average of annual extremes. Period of record, 1929-42.

rainfall. There are wide and frequent changes in weather, both from day to day and from season to season.

Table 1 shows temperature and precipitation data recorded at Tiptonville, in the western part of the county. The difference in elevation is so slight that these data are representative of the entire county. Precipitation increases slightly from west to east, but the difference in annual rainfall amounts to less than 1 inch.

Temperature.--The average annual temperature at Tiptonville is 60° F. Extremes of 109° and -13° were recorded during the period 1929-42, but prolonged periods of very cold or very hot weather are unusual. Periods of very mild temperatures occur almost every winter, and periods of cool, dry weather break up stretches of hot, humid weather in summer.

The average date of the last freezing temperature in spring is March 26. The average date of the first in fall is November 3. The growing season averages 221 days.

The probability of a freezing temperature occurring in spring after given dates and in fall before given dates can be determined from figure 2. To determine, for example, the probability of a temperature of 28° or less occurring in spring after March 8, first, look at the dates on the right-hand side of the figure and determine approximately where March 8 is on the scale; next, follow a rule horizontally from that point (the date) to where the rule intersects the diagonal line marked "28° F., Spring;" then follow the vertical rule from the point of intersection to the percent scale at the bottom of figure 2. For this example, the probability is 75 percent.

To determine the probability of a freezing temperature occurring in fall before the given dates, follow the same procedure but look for the date on the left side of the figure.

The freeze-free growing season is long enough to permit cotton, soybeans, corn, and vegetables to be planted over a period of weeks and still have time enough to mature. The winters are usually mild enough that fall-sown small grain furnishes grazing for livestock during winter. The temperature is

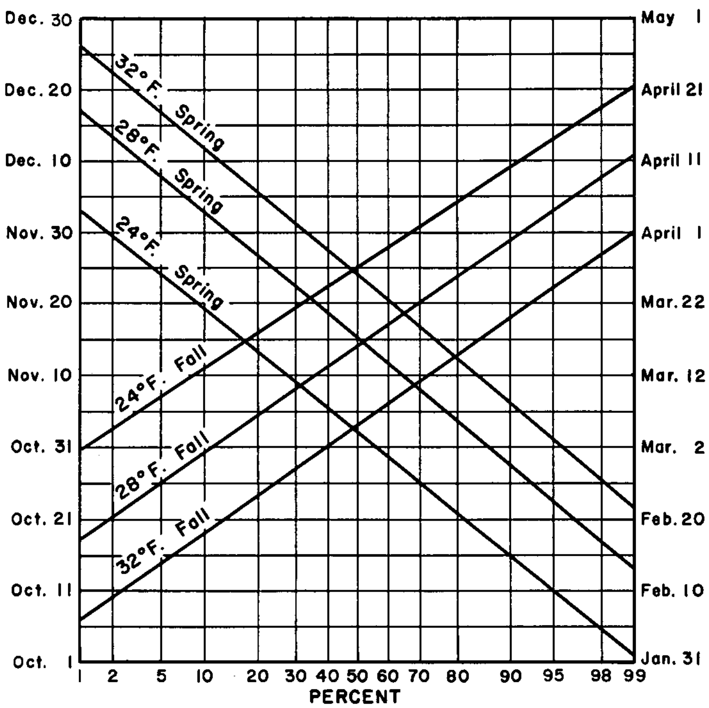

Figure 2.--Probability of given temperatures occurring in fall before any date and in spring after any date at Tiptonville, Lake County, Tenn.

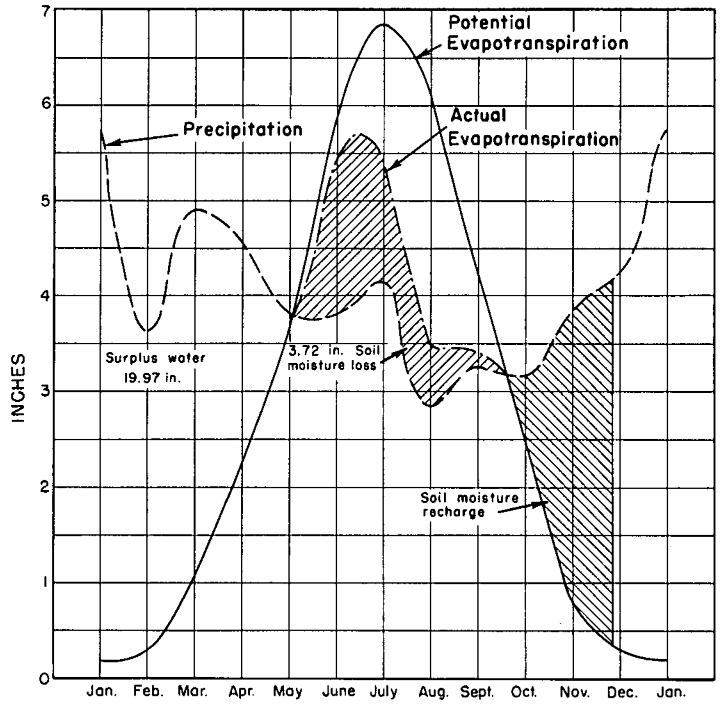

Figure 3.--Average water balance at Tiptonville, computed from data recorded from 1924 through 1942.

above 40° F. on many winter days, and pasture grasses make substantial growth.

Precipitation.--Lake County has periods of droughts and periods of plentiful and even excessive rainfall. The average annual rainfall is 48 inches. The annual totals recorded at Tiptonville ranged from 35.65 inches, in 1941, to 70.24 inches, in 1927. The highest total for one month was 18.08 inches in January 1937, a month in which a major flood occurred in the Mississippi Valley. Heavy local rains frequently result in flash floods in the valleys of the small rivers in the county. Winter and early spring are the rainiest times of the year; summer and early fall are the driest.

Water balance.--Figure 3 shows the average water balance at Tiptonville. More specifically, through the use of curves for average monthly precipitation, for potential evapotranspiration, and for actual evapotranspiration, figure 3 shows moisture conditions in the soils at the end of each month during an average year. Computations for figure 3 were made by the Thornthwaite method (4) 2/. The available moisture at field capacity is assumed to be 4 inches per foot of soil.

Figure 3 shows that, from January through the first few days of June, precipitation exceeds estimated actual evapotranspiration. From early in June through more than half of October, estimated actual evapotranspiration exceeds precipitation. Near the end of October, 3.72 inches of the original 4 inches of available water has been removed from the soil. Then, replacement of moisture lost during summer begins. This replacement is completed near the end of December, and again precipitation exceeds evapotranspiration. This excess precipitation is lost from the soil through surface or subsurface runoff.

The average moisture conditions shown in figure 3 are for the end of each month, but there are shorter periods of variation that are not shown. For example, usually the soil is dry enough to cultivate during a few days between rains early in spring, when precipitation exceeds evapotranspiration. Also, moisture conditions vary considerably from year to year because of variations in rainfall, temperature, and other factors.

The rate of plant growth is affected greatly by the amount of available moisture in the soil. The vertical distance between the actual and potential evapotranspiration curves in figure 3 indicates the amount of irrigation water needed to maintain maximum plant growth. The moisture deficit results because the precipitation during summer is not heavy enough to replace moisture lost by evaporation or to meet the needs of actively growing plants.

Severe storms.--Only six tornadoes were reported during the period 1916-63. The county is too far inland to experience damage from tropical storms. Ordinarily, at any one location there are two hailstorms a year.

Humidity, wind, and clouds.--The relative humidity is highest in winter and lowest in spring. The

2/ Underscored figures in parentheses refer to Literature Cited, page 37.

yearly average is about 70 percent.

The wind direction is variable but is predominantly from the south. Windspeed ranges from about 11 miles an hour in the period January through April to about 7 miles an hour in August. Average windspeed is about 9 miles an hour. Windspeed usually is lowest early in the morning and highest early in the afternoon.

Clouds cover less than six-tenths of the sky, on the average, between sunrise and sunset. Annually, the part of the sky that is covered ranges from about seven-tenths in January to about four-tenths in October. During the growing season the sun shines an average of slightly more than 70 percent of the possible time.

Soil scientists made this survey to learn what kinds of soils are in Lake County, where they are located, and how they can be used. They went into the county knowing they likely would find many soils they had already seen and perhaps some they had not. As they traveled over the county, they observed steepness, length, and shape of slopes; size and speed of streams; kinds of native plants or crops; kinds of rock; and many facts about the soils. They dug many holes to expose soil profiles. A profile is the sequence of natural layers, or horizons, in a soil; it extends from the surface down into the rock material that has not been changed much by leaching or by the action of plant roots.

The soil scientists made comparisons among the profiles they studied, and they compared these profiles with those in counties nearby and in places more distant. They classified and named the soils according to nationwide, uniform procedures. To use this soil survey efficiently, it is necessary to know the kinds of groupings most used in a local soil classification.

Soils that have profiles almost alike make up a soil series. Except for different texture in the surface layer, the major horizons of all the soils of one series are similar in thickness, arrangement, and other important characteristics. Each soil series is named for a town or other geographic feature near the place where a soil of that series was first observed and mapped. Reelfoot and Commerce, for example, are the names of two soil series. All the soils in the United States having the same series name are essentially alike in those characteristics that affect their behavior in the natural, undisturbed landscape. Soils of one series can differ somewhat in texture of the surface soil and in slope, stoniness, or some other characteristic that affects use of the soils by man.

Many soil series contain soils that differ in the texture of their surface layer. According to such differences in texture, separations called soil types are made. Within a series, all the soils having a surface layer of the same texture belong to one soil type. Reelfoot silt loam and Reelfoot silty clay loam are two soil types in the Reelfoot series. The difference in the texture of their surface layers is apparent from their names.

Some types vary so much in slope, degree of erosion, number and size of stones, or some other feature affecting their use, that practical suggestions about their management could not be made if they were shown on the map as one unit. Such soil types are divided into phases (6). The name of a soil phase indicates a feature that affects management. For example, Commerce silt loam, frequently flooded, is one of two phases of Commerce silt loam, a soil type that has been divided into two phases because the flood hazard affects the use of some areas.

After a guide for classifying and naming the soils had been worked out, the soil scientists drew the boundaries of the individual soils on aerial photographs. These photographs show woodlands, buildings, field borders, trees, and other details that help in drawing boundaries accurately. The soil map at the back of this soil survey was prepared from the aerial photographs.

The areas shown on a soil map are called mapping units. On most maps detailed enough to be useful in planning management of farms and fields, a mapping unit is nearly equivalent to a soil type or a phase of a soil type. It is not exactly equivalent, because it is not practical to show on such a map all the small, scattered bits of soil of some other kind that have been seen within an area that is dominantly of a recognized type or phase.

In preparing some detailed maps, the soil scientists have a problem of delineating areas where different kinds of soils are so intricately mixed or occur in such small individual tracts that it is not practical to show them separately on the map. They show such a mixture of soils as one mapping unit and call it a soil complex. Ordinarily, a soil complex is named for the major kinds of soil in it, for example, Reelfoot-Bruno Complex.

Another kind of mapping unit is the undifferentiated group, which consists of two or more soils that occur together without regularity in pattern or relative proportion. The individual tracts of the component soils could be shown separately on the map, but differences among the soils are not enough to merit separation for the objectives of the survey. An example is Bruno soils and Alluvial land.

Most surveys include areas where the soil material is so rocky, so shallow, or so frequently worked by wind and water that it cannot be classified by soil series. These areas are shown on the map like other mapping units, but they are given descriptive names, such as Levees and Borrow Pits or Swamp, and are called land types.

While a survey is in progress, samples of soils are taken for laboratory measurements and for engineering tests. Laboratory data from the same kinds of soils in other places are assembled. Data on yields of crops under defined practices are assembled from farm records and from field or plot experiments on the same kinds of soils. Yields under defined management are estimated for selected soils.

But only part of a soil survey is done when the soils have been named, described, and delineated on the map, and the laboratory data and yield data have been assembled. The mass of detailed information then needs to be organized in such a way as to be readily useful to different groups of readers, among them farmers, managers of woodland, engineers, and homeowners. Grouping soils that are similar in suitability for each specified use is the method of organization commonly used in the soil surveys. On the basis of yield and practice tables and other data, the soil scientists set up trial groups. They test these groups by further study and by consultation with farmers, agronomists, engineers, and others; then they adjust the groups according to the results of their studies and consultation. The groups that are finally evolved reflect up-to-date knowledge of the soils and their behavior under present methods of use and management.

The general soil map at the back of this soil survey shows, in color, the soil associations in Lake County. A soil association is a landscape that has a distinctive proportional pattern of soils. It normally consists of one or more major soils and at least one minor soil, and it is named for the major soils. The soils in one association may occur in another, but in a different pattern.

A map showing soil associations is useful to people who want a general idea of the soils in a county, who want to compare different parts of a county, or who want to know the location of large tracts that are suitable for a certain kind of farming or other land use. Such a map is not suitable for planning the management of a farm or field, because the soils in any one association ordinarily differ in slope, depth, stoniness, drainage, and other characteristics that affect management.

The four associations in Lake County are described in this section. The terms for texture used in the title for each association apply to the surface layer. For example, in the title for association 1, the words "loamy and silty" refer to the texture of the surface layer. More detailed information about the individual soils in each association can be obtained by studying the detailed soil map and by reading the section "Descriptions of the Soils."

1. Commerce-Adler-Robinsonville Association

Somewhat poorly drained to well-drained, loamy and silty soils on first bottoms of the Mississippi River

This association lies along the western edge of Lake County, mainly between the Mississippi River and the main levee. The width of the areas ranges from 8 miles to only a few feet but is most commonly between 2 and 3 miles. The association covers about 30 percent of the county.

The highest parts of this association generally are along the river, but a few knolls 10 to 25 acres in size are 5 feet higher than the riverbank. The lowest parts are 5 to 15 feet lower than the riverbank and at some distance from it. Nearly level fields between 50 and 300 acres in size are common. The association slopes very gently eastward from the river and southward with the natural fall of the river. Old sloughs, which form natural drainageways, meander north and south. Most are 100 yards or less in width; some are wider.

The major soils in this association are the Commerce, Adler, and Robinsonville. Commerce soils occupy about 25 percent of the association, Adler soils 20 percent, and Robinsonville soils 20 percent. The rest of the association is made up of Bowdre, Bruno, Iberia, and Sharkey soils. The coarser textured and better drained soils are nearest the river.

Commerce soils are silty and lack a noticeable amount of clay in the subsoil. They are somewhat poorly drained and have gray mottles below a depth of about 12 inches. Adler soils are at higher elevations than Commerce soils. They are silty throughout and are moderately well drained. Robinsonville soils, at the highest elevations nearest the river, have a noticeable amount of fine sand and very fine sand in their subsoil. They are well drained.

Bowdre soils are next to Commerce soils and also in the wider sloughs and on some higher spots. Bruno soils occur chiefly as strips along the river, but some areas are scattered throughout the association. Sharkey and Iberia soils are in the lowest parts and in a few sloughs.

The soils of this association are neutral to moderately alkaline in reaction. All are high in natural fertility.

Nearly all of this association is cultivated annually. Soybeans, cotton, and corn are the main crops. Grain sorghum, watermelons, and sunflowers are grown on the more sandy and droughty soils. One large, low, wet tract in the southern part of the association is wooded. Also, some strips along the river have been left wooded so as to control scouring by floodwaters.

Most farms in this association are between 100 and 300 acres in size, but some are as much as 1,000 acres. Some are entirely in cultivation.

Flooding and standing water are serious limitations (pl. I). Only the highest knolls and a few protected areas escape being flooded each spring. Farmers are forced to plant late in some years, but seldom late enough that crop yields are reduced. Floods and standing water kill long-lived plants, such as alfalfa, and spread johnsongrass.

Scouring resulting from flooding is a serious hazard, especially in the southern part of the association. Floodwaters at times wash out holes 2 to 10 acres in size and 10 to 30 feet in depth (pl. II). Very sandy deposits are left just downstream from these holes (pl. II). Elevated roads have been constructed in recent years, and these are expected to help control floodwaters and thus control scouring.

2. Reelfoot-Tiptonville-Adler Association

Somewhat poorly drained and moderately well drained, silty and loamy soils on high bottoms of the Mississippi River

This association runs north to south in a strip that lies between the main levee and Running Reelfoot Bayou. It is in the highest part of the county and is broken in only a few places by low, broad flats that mark former channels of the Mississippi River. The association covers about half of the county.

The highest parts of this association are the tops of the broad, nearly level ridges, or swells. The tops of some of these are as much as 15 feet above the lowest places in the association. The ridges run north to south and slope very gently

eastward toward Reelfoot Lake or Running Reelfoot Bayou and westward toward the main levee. Old sloughs meander through the association. These, along with drainage ditches and ditches along the roads, provide drainage for the fields, which are 25 to 100 acres in size.

The major soils in this association are the Reelfoot, Tiptonville, and Adler. The Reelfoot soils occupy about 30 percent of the association, the Tiptonville about 20 percent, and the Adler about 15 percent. The rest of the association is made up of Worthen, Iberia, Sharkey, Crevasse, and Commerce soils.

Reelfoot soils are somewhat poorly drained. They have a very dark colored surface layer over a yellowish-brown or brown subsoil that shows some grayish mottling throughout. Tiptonville soils are at higher elevations than the Reelfoot. They have a very dark colored surface layer and a brown or yellowish-brown subsoil. They are moderately well drained and show some mottling at depths below 1½ or 2 feet. The Adler soils, at the highest elevations and also moderately well drained, have a dark-colored surface layer and some mottling beginning at a depth of about 1½ feet.

In the lowest parts of this association are the Iberia and Sharkey soils. The very sandy Crevasse soils, often referred to as sand blows, are scattered over the association, as are also the silty Commerce soils. The Worthen soils are at the highest elevations along with one of the major soils, the Adler.

The soils of this association formed in alluvium, most of it silty or loamy, that was deposited before the Mississippi River shifted westward to its present location. The soils range from slightly acid to mildly alkaline. Generally, they do not need lime. Response to fertilizer is generally good on all the soils except the Crevasse. Nearly all the soils except the Crevasse have high or very high available moisture holding capacity.

This association contains some of the most desirable farmland in the county. Practically all of it is cultivated. Cotton, corn, and soybeans are the main crops. Some fields are in alfalfa, and a few areas are pastured. Most of the farms are 100 to 200 acres in size; some are larger.

Many large fields yield well under only customary good management. On others, water stands for a day or two after heavy rainfall. Ordinarily, the water is removed sooner than this by the network of ditches. The water does not seriously interfere with production of cotton, corn, soybeans, and similar annual crops. The sandy Crevasse soils are droughty and low yielding and are a source of duststorms if not carefully managed.

Many sites in this association are suitable for homes and other urban developments. The low, wet areas and droughty places need to be avoided. The towns of Tiptonville and Ridgely are in this association.

3. Iberia-Sharkey-Bowdre Association

Poorly drained and somewhat poorly drained, dark-colored, silty and clayey soils on low, broad flats

This association is on low, broad flats that are parts of abandoned channels of the Mississippi River. It covers about 15 percent of the county.

Variations in elevation are slight, but some strips rise as much as 10 feet above the surrounding flats. The flats were once drained by winding sloughs, but most of these sloughs have been replaced by dug channels and ditches that curve smoothly through the lowest parts of the association and then branch out. Ditches along fields and roads also help to provide drainage. Square and rectangular fields between 50 and 100 acres in size are common.

The major soils in this association are the Iberia, Sharkey, and Bowdre. Iberia soils occupy about 45 percent of the association, Sharkey soils 25 percent, and Bowdre soils 20 percent. The rest of the association is made up of Commerce and Tunica soils and of Swamp.

Iberia soils are poorly drained. They consist of 10 to 20 inches of silt loam or silty clay loam over thick beds of clay. Sharkey soils, which also are poorly drained, consist of clay to a depth of 40 inches or more. They are conspicuous in the low parts of the association. Bowdre soils are somewhat poorly drained. They consist of 10 to 20 inches of clayey material over loamy and silty material.

Commerce soils are somewhat poorly drained, and Tunica soils are poorly drained. These soils are on broad flats next to Bowdre and Sharkey soils. Swamp is in the lowest parts of the association and remains covered with water nearly all year.

The soils of this association formed in clayey sediments that were deposited by ponded water from the Mississippi River. They have a dark-colored, silty and clayey surface layer.

Nearly all of this association is cultivated. Soybeans, the main crop, is grown on about one-fourth of each area of the association. Cotton is grown in the higher, better drained parts. Only a few fields are used for corn and small grain. Wooded areas make up less than 10 percent of the association and are mainly in the lowest part. Some tracts have no woods.

Most of the farms are between 100 and 200 acres in size, but some are much larger. Few of the landowners live on their farms.

This association is protected by a system of levees, but runoff from higher associations collects during heavy rainfall. Ditches remove the excess water from half the association almost immediately and from most other places in a few hours. Water remains for 1 or 2 weeks on fields next to Running Reelfoot Bayou and the levee, but ordinarily does not remain late enough in the year to prevent the planting of crops.

Favorable building sites are scarce in this association. The settlement of Wynnburg is in this association.

4. Sharkey-Tunica Association

Poorly drained, dark-colored, clayey soils on low flats

This association lies along the northwestern shoreline of Reelfoot Lake, in the northeastern part of the county. It covers only 5 percent of the county and is the swampiest part.

The highest part of this association is not more than about 5 feet above the normal water level of the lake, and a good part is only 1 to 3 feet above it. Several round lakes 5 to 20 acres in size stay filled with water. Ronaldson Slough is the largest of several crooked sloughs that meander through the association. At the southern tip is a peninsula that extends into Reelfoot Lake. This peninsula is separated from the main body of the association by Ronaldson Ditch and another ditch.

The major soils in this association are the Sharkey and Tunica. Sharkey soils occupy about 70 percent of the association, and Tunica soils 15 percent. The rest of the association consists of Bowdre soils and Swamp.

Sharkey soils, which are poorly drained, are just above the water level of Reelfoot Lake. They consist of clay to a depth of 40 inches or more.

Tunica soils, which are also poorly drained, consist of 20 to 40 inches of dark-colored clay over several feet of silty or loamy soil material. Tunica soils are next to and on about the same level as Sharkey soils.

Swamp is about at lake level and is wet except during the driest parts of summer and fall. Bowdre soils are somewhat poorly drained. They occur as crooked strips between meandering sloughs and are at the highest elevations in the association.

Almost all of this association is flooded each winter and spring. When Reelfoot Lake is at its highest level, between 2/3 and 3/4 of the association is under water. The rest of the year, the water table is 1 to 3 feet below the surface in a third of the association and only a little lower in another third.

This association is practically all wooded. It is used mainly for hunting and fishing. Some lumber is harvested. Only three areas have been cleared. One of these, along the northwestern edge, is too wet for crops. The other two extend southward and are cultivated each year.

The woodland is owned by the Tennessee Game and Fish Commission and is open to hunters of squirrel, raccoon, deer, and waterfowl. The lakes and sloughs are open to fishermen. There are no houses in this association.

In this section the soils and land types of Lake County are described and their use and management as cropland, as woodland, and as wildlife habitat are discussed. Following the name of each soil and land type is the symbol that identifies that unit on the detailed soil map at the back of this publication. For each kind of soil there is a short description of a typical soil profile and a much more detailed description of the same profile that scientists, engineers, and others can use in making highly technical interpretations.

At the end of each description is the symbol for the capability unit in which the soil has been placed. An explanation of the capability classification system begins on page 23. Table 2 shows the acreage and proportionate extent of each soil. Technical terms used to describe the soils are defined in the Glossary.

Adler silt loam (0 to 2 percent slopes) (Ad).--This is a deep, moderately well drained, fertile soil that is scattered through the eastern two-thirds of the county. It formed in sediments from the Mississippi River. It is protected by levees.

In a typical profile the surface layer is about 8 inches of dark grayish-brown silt loam. Below this layer is brown to dark grayish-brown silt loam and loam. Grayish-brown and gray mottles below a depth of 8 inches indicate occasional waterlogging.

Representative profile (about 0.5 mile west of New Markham):

Ap--0 to 8 inches, dark grayish-brown (10YR 4/2) silt loam; weak, fine, granular structure; very friable; pH 7.5; gradual, smooth boundary.

C1--8 to 26 inches, brown (10YR 5/3) silt loam; few, medium, grayish-brown mottles; weak, fine, granular structure; very friable; pH 7.5; gradual, smooth boundary.

C2--26 to 40 inches, dark grayish-brown (10YR 4/2) silt loam; common, medium, gray mottles; massive; very friable; pH 7.5; clear, smooth boundary.

C3--40 to 72 inches, dark grayish-brown (10YR 4/2) loam; common, medium, gray mottles; massive; very friable; pH 7.5.

Below a depth of 3 feet, the full range in texture is fine sandy loam to silty clay loam. Silt loam and loam are dominant, but in places there are 6- to 12-inch layers of fine sandy loam or silty clay loam.

This soil is next to Commerce silt loam and Worthen silt loam. It is better drained than the Commerce soil but not so well drained as the Worthen. It has a lighter colored surface layer and is more acid than the Worthen soil.

Adler silt loam is high in content of phosphorus and potassium. Lime is not needed, since the reaction is neutral or mildly alkaline.

This soil is easy to work and to keep in good tilth. Roots, water, and air penetrate readily. Plants nearly always have enough moisture because the available moisture holding capacity is high.

Nearly all the acreage is used for row crops, mainly cotton, corn, and soybeans. Wheat and alfalfa also are grown. Production is good if only those good practices ordinarily used in the county are applied. Erosion is not a hazard. Row crops can be grown every year.

None of the acreage is wooded, but this soil

TABLE 2.--APPROXIMATE ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Soil	Area	Extent	Soil	Area	Extent
	Acres	Percent		Acres	Percent
Adler silt loam	6,300	6.0	Reelfoot silt loam	10,275	9.8
Adler silt loam, frequently flooded	5,100	4.9	Reelfoot silty clay loam	2,540	2.4
Bowdre silty clay	7,180	6.8	Reelfoot-Bruno Complex	1,800	1.7
Bowdre silty clay, frequently flooded	4,370	4.2	Robinsonville fine sandy loam, frequently flooded	5,080	4.8
Bruno soils and Alluvial land	3,500	3.3	Sharkey clay	10,150	9.7
Commerce silt loam	7,500	7.1	Swamp	2,590	2.5
Commerce silt loam, frequently flooded	7,370	7.0	Tiptonville silt loam	7,105	6.8
Crevasse loamy sand	2,975	2.8	Tunica clay	1,250	1.2
Iberia silt loam	5,720	5.4	Tunica clay, frequently flooded	480	.5
Iberia silty clay loam	9,580	9.1	Worthen silt loam	2,270	2.2
Levees and Borrow Pits	1,540	1.5	Total	1/ 104,960	100.0
Mhoon clay	285	.3			

1/ Land area as reported in the 1959 Census of Agriculture.

could produce high yields of cherrybark oak, water oak, cottonwood, sweet pecan, and sweetgum.

Wildlife food can be grown in abundance. Excellent food and cover for quail can be provided in odd-shaped areas between fields, on ditchbanks, and in field corners. (Capability unit I-1)

Adler silt loam, frequently flooded (0 to 2 percent slopes) (Af).--This is a deep, moderately well drained, fertile soil that occurs along the western edge of the county, between the Mississippi River and the levees.

In a typical profile the surface layer is about 8 inches of dark grayish-brown silt loam. Below this layer is brown to dark grayish-brown silt loam and loam. Gray mottles indicate that the soil is waterlogged for short periods.

Representative profile (about 1 mile north of Tennessee Highway No. 79, near Hathaway Church):

Ap--0 to 8 inches, dark grayish-brown (10YR 4/2) silt loam; weak, fine, granular structure; very friable; pH 7.0; clear, smooth boundary.

C1--8 to 28 inches, brown (10YR 5/3) silt loam; few, medium, gray mottles; weak, medium, granular structure; very friable; pH 7.0; clear, smooth boundary.

C2--28 to 48 inches, dark grayish-brown (10YR 4/2) silt loam; common, medium, gray mottles; massive; very friable; pH 7.5; clear, smooth boundary.

C3--48 to 80 inches, grayish-brown (10YR 5/2) loam or silt loam; common, fine, gray and dark-brown mottles; massive; very friable; pH 7.5.

The A horizon is very dark grayish brown in some areas. The texture of the topmost 3 feet is loam or very fine sandy loam in a few areas. Layers of silty clay loam 6 to 12 inches thick occur below a depth of 3 feet in some areas.

This soil is next to Robinsonville fine sandy loam, frequently flooded, and Commerce silt loam, frequently flooded. It has less sand in the topmost 3 feet than the Robinsonville soil, and less clay than the Commerce soil.

This Adler soil is high or very high in content of phosphorus and potassium. Lime is not needed, since the reaction is neutral or mildly alkaline.

Most of the acreage is flooded for 2 or 3 weeks nearly every winter or spring. Areas protected by roads are flooded less frequently than other areas. When the excess water drains away, this soil is easy to work and to keep in good tilth. Roots, water, and air penetrate readily. Plants generally have a good supply of moisture because the available moisture holding capacity is high.

Flooding in winter and spring limits use of this soil to summer crops. Row crops, mainly cotton, corn, and sorghum, are grown in practically all areas. Long-lived perennials, such as alfalfa, are killed by flooding. Production is good if only those good practices ordinarily used in the county are applied. Erosion is not a hazard.

Little of the acreage is wooded, but this soil could produce high yields of sweet pecan, cherrybark oak, water oak, cottonwood, and sweetgum.

Wildlife food and cover can be grown in abundance. Food and cover for quail can be provided by growing summer annual crops in odd-shaped areas between fields, on ditchbanks, and in field corners. (Capability unit IIw-1)

Bowdre silty clay (0 to 2 percent slopes) (Bo).--This is a somewhat poorly drained soil scattered through the eastern two-thirds of the county. It is on low, broad, flat areas along the edges of former channels of the Mississippi River.

In a typical profile the surface layer is about 6 inches of very dark grayish-brown silty clay. Below this layer is very dark grayish-brown to gray clay, silty clay loam, silt loam, and loam. This material is mottled with yellowish brown, dark brown, and gray below a depth of about 18 inches.

Representative profile (about 3.5 miles north of Tiptonville and 0.5 mile east of Tennessee Highway No. 78):

Ap--0 to 6 inches, very dark grayish-brown (10YR 3/2) silty clay; moderate, fine and medium, granular structure; friable when moist, plastic and sticky when wet; pH 7.5; abrupt, smooth boundary.

C1--6 to 14 inches, very dark grayish-brown (10YR 3/2) clay; moderate, medium, angular and subangular blocky structure; firm when moist, plastic and sticky when wet; pH 7.5; clear, smooth boundary.

IIC2--14 to 18 inches, very dark grayish-brown (10YR 3/2) silty clay loam; massive; friable; pH 7.5; clear, smooth boundary.

IIC3--18 to 30 inches, dark grayish-brown (10YR 4/2) silt loam; common, medium, yellowish-brown, dark-brown, and gray mottles; massive; very friable; pH 7.5; gradual, smooth boundary.

IIC4--30 to 72 inches, gray (10YR 5/1) loam; common, medium, dark grayish-brown, yellowish-brown, and dark-brown mottles; massive; very friable; pH 7.5.

The clayey layer extends to a depth of 8 to 20 inches. Below this layer most commonly are alternating layers of two or more of the following textures: silty clay loam, silt loam, loam, or very fine sandy loam. Layers of loamy sand or sand occur in a few spots at a depth between 20 and 72 inches.

This soil has more clay in the surface layer than Commerce soils. It has more clay in the topmost 20 inches than Iberia soils but has less clay below that depth. This Bowdre soil is somewhat similar to Tunica clay, but in the Tunica soil, clay extends to a depth of 20 to 40 inches.

The content of phosphorus and potassium is high. Lime is not needed, since the reaction is neutral or mildly alkaline. Nonlegume crops, such as cotton, corn, and wheat, show excellent response to nitrogen.

This soil is not flooded by the river, but water stands on it for 1 or 2 days following heavy rainfall. The surface layer swells when wet and becomes

plastic and sticky; then it shrinks as it dries, and a network of cracks forms. Tillage is easy only when the soil is barely moist. Plants nearly always have a good supply of moisture because the soil has high available moisture holding capacity.

Row crops can be grown every year. The main crops are soybeans, cotton, and corn. Alfalfa is grown in a few fields, and also some winter wheat.

Excess water is the main limitation. Drainage ditches are needed, and some smoothing or grading would eliminate the pockets in which water stands.

Practically all of this soil has been cleared, but sweet pecan, cherrybark oak, white oak, water oak, cottonwood, and sweetgum would produce high yields.

This soil can produce abundant food and cover for wildlife. Fence rows, field borders, and ditchbanks are good sites for wildlife plantings that attract quail and small animals. (Capability unit IIw-2)

Bowdre silty clay, frequently flooded (0 to 2 percent slopes) (Bs).--This is a somewhat poorly drained soil on the outer edges of former channels of the Mississippi River. It occurs between the river and the levees, where flooding is severe.

In a typical profile the surface layer is about 6 inches of very dark grayish-brown silty clay. Below this layer is about 12 inches of very dark grayish-brown silty clay. The underlying material consists of brown to gray silt loam and silty clay loam. Mottling below a depth of 18 inches indicates wetness.

Representative profile (about 1 mile east of the Mississippi River and 500 yards south of Tennessee Highway No. 79):

Ap--0 to 6 inches, very dark grayish-brown (10YR 3/2) silty clay; moderate, medium, granular structure; friable when moist, plastic and sticky when wet; pH 7.3; clear, smooth boundary.

C1--6 to 18 inches, very dark grayish-brown (10YR 3/2) silty clay; massive; firm when moist, plastic and sticky when wet; pH 7.0; clear, smooth boundary.

IIC2--18 to 38 inches, brown (10YR 5/3) silt loam; common, medium, light brownish-gray mottles; massive; friable; pH 7.0; clear, smooth boundary.

IIC3--38 to 60 inches, grayish-brown (10YR 5/2) silty clay loam; common, medium, light-gray mottles and few, medium, yellowish-brown mottles; pH 7.0; clear, smooth boundary.

IIC4--60 to 72 inches, gray (10YR 5/1) silt loam; common, medium, light-gray mottles and few, medium, yellowish-brown mottles.

The clayey layer extends to a depth of 8 to 20 inches. Below this layer most commonly are alternating layers of two or more of the following textures: silty clay loam, silt loam, loam, or very fine sandy loam. These layers occur below a depth of 20 inches.

This soil is next to Commerce silt loam, frequently flooded, and Tunica clay, frequently flooded. It has more clay in the topmost 20 inches than the Commerce soil. It has thinner clayey layers than the Tunica soil, in which clay extends to a depth of 20 to 40 inches.

The content of phosphorus and potassium is high, and crops show little response to fertilizer containing these elements. Lime is not needed, since the reaction is neutral or mildly alkaline. Nonlegume crops, such as cotton and corn, show excellent response to nitrogen.

Floodwater from the Mississippi River covers this soil for 2 or 3 weeks nearly every spring, but it generally drains away in time for crops to be planted. The surface layer swells when wet then shrinks and cracks as it dries. It is difficult to work when wet but easy to work when barely moist. Plants commonly have a good supply of moisture because the available moisture holding capacity is high or very high.

Soybeans, cotton, and corn can be planted every year. Long-lived crops, such as alfalfa, and pasture plants, such as tall fescue and white clover, cannot survive flooding.

Flooding and standing water are the main limitations. Spring planting is delayed in some years. Drainage ditches are needed, but even these do not remove all the excess water from low areas. Grading and smoothing would eliminate these low areas, but floods would scour out new ones after one or two cropping seasons.

Little of the acreage is wooded, but high yields of sweet pecan, cherrybark oak, water oak, cottonwood, and sweetgum could be produced.

Summer annual crops that provide food for wildlife can be grown in abundance on this soil. Crops that grow in winter and spring are poorly suited, because of flooding, and most kinds of wildlife cannot stay in these areas during the flood season. Some tracts could be managed as waterfowl habitat if leveed so that they could be flooded in winter and then drained and planted to corn or millet in summer. (Capability unit IIIw-1)

Bruno soils and Alluvial land (0 to 2 percent slopes) (Bu).--This mapping unit is excessively drained. It occurs mostly in the southern part of the county but is in scattered areas elsewhere. Nearly half the acreage is between the Mississippi River and the levee and is severely flooded. The rest is protected by the levee. The soils formed in very sandy sediments deposited by swift waters of the Mississippi River.

The surface layer of a typical Bruno soil is about 12 inches of dark grayish-brown sandy loam. The next layer is pale-brown loamy sand or sand. Below a depth of about 45 inches, the material is dark grayish-brown loam or fine sandy loam. Alluvial land commonly consists of 35 to 40 inches of sand underlain by soil material ranging from clay to sand.

Representative profile of a Bruno sandy loam (about 0.5 mile east of Hathaway Church):

Ap--0 to 12 inches, dark grayish-brown (10YR 4/2)

sandy loam; weak, fine, granular structure; very friable; pH 7.5; abrupt, smooth boundary.

C1--12 to 45 inches, pale-brown (10YR 6/3) loamy sand or sand; single grain; loose; pH 7.0; abrupt, smooth boundary.

IIC2--45 to 60 inches, dark grayish-brown (10YR 4/2) loam; weak, medium, granular structure; very friable; pH 7.5; abrupt, smooth boundary.

IIC3--60 to 72 inches, dark grayish-brown (10YR 4/2) fine sandy loam; weak, medium, granular structure; very friable; pH 7.5.

The texture of the surface layer is sandy loam or loam. The C1 horizon of the Bruno soils is 36 inches or more thick in some places. The texture of the IIC horizon ranges from sand to clay. Alluvial land is less than 40 inches of sand in some places and contains thin layers of sandy loam or loam at a depth of 10 to 40 inches in other places.

This mapping unit lies next to Adler, Crevasse, and Robinsonville soils in areas between the Mississippi River and the levee and next to Adler, Crevasse, Reelfoot, Tiptonville, and Worthen soils in areas protected by the levee. The mapping unit contains less sand than the Crevasse soils but more sand than any of the other adjacent soils.

This mapping unit is high in natural fertility and is neutral or mildly alkaline in reaction. Lime is not needed. The content of phosphorus and potassium is high. Winter crops, such as wheat, show good response to nitrogen, and nonlegume summer crops show fair to good response.

Soybeans and sorghum are the main crops in the areas between the Mississippi River and the levee. Wooded strips have been left along the river to break the force of floodwaters. Soybeans and small grain, such as winter wheat, are the main crops grown in areas protected by levees. Sorghum, watermelons, and sunflowers also grow fairly well in these areas.

Flooding is the main limitation to use of the areas near the river (pl. III). Only summer crops are suitable; winter crops are nearly always killed. Droughtiness is the main limitation in the protected areas where the available moisture holding capacity is low. Winter crops, such as small grain, and drought-resistant summer crops, such as sorghum and sunflowers, are the best choices.

Except for narrow strips along the Mississippi River, practically all of this mapping unit has been cleared. Cottonwood, sycamore, hackberry, and black willow would grow well on the Bruno soils.

Because of droughtiness and flooding, food and cover for wildlife is limited. Sunflowers and sorghum grow well in summer, and unless a severe flood occurs, small grain grows well in winter. (Capability unit IIIs-1)

Commerce silt loam (0 to 2 percent slopes) (Cm).--This is a fertile but somewhat poorly drained soil on bottom lands scattered through the eastern two-thirds of the county. It is protected by levees.

In a typical profile the surface layer is about 8 inches of dark grayish-brown silt loam. Below this layer is dark grayish-brown, grayish-brown, and dark-gray silt loam and loam. At a depth of about 42 inches is dark-gray silty clay loam. Mottling below a depth of about 12 inches indicates excessive wetness.

Representative profile (about 1 mile southeast of Wynnburg):

Ap--0 to 8 inches, dark grayish-brown (10YR 4/2) silt loam; weak, fine, granular structure; very friable; pH 6.5 to 7.0; abrupt, smooth boundary.

C1--8 to 16 inches, dark grayish-brown (10YR 4/2) silt loam; few, fine, brown mottles; massive; friable; pH 7.5; clear, smooth boundary.

C2--16 to 23 inches, dark grayish-brown (10YR 4/2) loam; common, medium, dark yellowish-brown and yellowish-brown mottles; massive; pH 7.5; clear, smooth boundary.

C3--23 to 32 inches, dark-gray (10YR 4/1) silt loam; common, medium, dark grayish-brown mottles; massive; friable; pH 7.5; clear, smooth boundary.

C4--32 to 42 inches, grayish-brown (10YR 5/2) silt loam; common, medium, brown and dark-brown mottles; massive; very friable; pH 7.5; clear, smooth boundary.

C5--42 to 72 inches, dark-gray (10YR 4/1) silty clay loam; common, medium, gray mottles and few, medium, dark-brown mottles; massive; friable; pH 7.5.

The texture is silt loam or loam to a depth of about 2½ feet and ranges from fine sandy loam to clay below that depth. In a few places the underlying material consists of old soils that have 12 to 18 inches of very dark gray silt loam over 2 to 3 feet of yellowish-brown and gray silty clay loam.

Commerce silt loam is next to Adler silt loam, Iberia soils, and Reelfoot soils. It is not so well drained as the Adler soil, and it has more clay between depths of 20 and 40 inches. It is better drained and has less clay, especially in the topmost 20 inches, than Iberia soils. Commerce silt loam has a lighter colored surface layer than Reelfoot soils and is less acid between depths of 20 and 40 inches.

This soil is neutral or mildly alkaline. Lime is not needed. The content of phosphorus and potassium is high, but many crops respond well if fertilizer containing these elements is applied. Nonlegume crops give excellent response to nitrogen.

This soil is excessively wet during most of the winter and early in spring. Water stands for a few days in some areas and for as long as 2 weeks in a few tracts next to the levee. As soon as this water drains away, the soil is easy to work. Roots, water, and air penetrate readily to a depth of 4 feet or more in most places, but their movement is restricted in a few areas that are underlain by clay at a depth of 2 to 4 feet. Plants generally have a good supply of moisture because the available moisture holding capacity is high.

Nearly all of the acreage is cultivated, mainly

to cotton (pl. III), corn, and soybeans. Long-lived perennials, such as alfalfa, and winter crops, such as small grain, grow well only on the better drained sites. Row crops can be grown every year.

Excess water ordinarily is removed readily through a network of drainage ditches, but there are a few places next to the levee from which the excess water cannot be removed while the river is high, because outlets are not available. Grading or smoothing would eliminate low spots and improve surface drainage.

Little or none of the acreage is wooded, but high yields of cherrybark oak, cottonwood, sweetgum, sweet pecan, and other kinds of trees could be produced.

Food and cover for wildlife could be produced in abundance, but little of this soil is used for wildlife plantings. (Capability unit I-2)

Commerce silt loam, frequently flooded (0 to 2 percent slopes) (Co).--This is a somewhat poorly drained, fertile soil that occurs between the levee and the Mississippi River, where flooding is severe.

In a typical profile dark grayish-brown silt loam extends to a depth of about 38 inches and is underlain by very dark grayish-brown silty clay loam. Mottling below a depth of about 12 inches indicates excessive wetness.

Representative profile (1.5 miles northwest of Mooring):

Ap--0 to 8 inches, dark grayish-brown (10YR 4/2) silt loam; weak, fine, granular structure; very friable; pH 7.5; abrupt, smooth boundary.

C1--8 to 16 inches, dark grayish-brown (10YR 4/2) silt loam; few, medium, grayish-brown mottles; weak, fine, granular structure; very friable; pH 7.5; clear, smooth boundary.

C2--16 to 38 inches, dark grayish-brown (10YR 4/2) silt loam; common, medium mottles of gray, dark brown, and yellowish brown; massive; very friable; many black stains; pH 7.5; gradual, smooth boundary.

C3--38 to 62 inches, very dark grayish-brown (10YR 3/2) silty clay loam; many, medium, gray mottles and few, medium, dark-brown and yellowish-brown mottles; massive; friable; pH 7.5; clear, smooth boundary.

C4--62 to 72 inches, gray (10YR 5/1) loam; common, medium, yellowish-brown mottles; massive; very friable; pH 7.5.

The topmost 30 inches generally is silt loam or loam. Below a depth of 30 inches the texture ranges from fine sandy loam to clay. Alternating layers of silt loam, silty clay loam, loam, and fine sandy loam are common below a depth of 2½ feet.

This soil is next to Adler silt loam, Robinsonville fine sandy loam, frequently flooded, Bowdre silty clay, and Iberia soils. It is not so well drained as the Adler and Robinsonville soils. It has slightly more clay at a depth of 20 to 40 inches than the Adler soil and has slightly less sand at that depth than the Robinsonville soil. Commerce silt loam, frequently flooded, has less clay in the topmost 20 inches than the Bowdre soil.

This Commerce soil is neutral to moderately alkaline. Lime is not needed. The content of phosphorus and potassium is high or very high, and crops generally give only fair response if fertilizer containing these elements is applied. Most nonlegume crops give excellent response to nitrogen.

Floodwater from the Mississippi River covers most of this soil for 2 or 3 weeks during wet periods in winter and spring. Areas protected by roads are flooded less frequently. After the floodwater recedes and the excess water drains away, this soil is easy to work. Roots, water, and air penetrate readily. Plants generally have a good supply of moisture because the available moisture holding capacity is high.

Practically all of this soil is cultivated, and row crops can be grown every year. Cotton, corn, and soybeans are the main crops. Long-lived perennials, such as alfalfa, and winter crops, such as small grain, cannot tolerate the excessive wetness.

Drainage ditches help to remove excess water after floods, but they are not effective in preventing flooding or removing floodwater. The ditches are likely to be filled with sediment after only one or two seasons.

Little of this soil is wooded, but several kinds of hardwoods could be grown.

Food and cover for wildlife could be grown in abundance, but little of this soil is used for wildlife plantings. (Capability unit IIw-3)

Crevasse loamy sand (0 to 2 percent slopes) (Cr).--This is an excessively drained soil that formed in very sandy sediments from the Mississippi River. It occurs mostly as tracts 5 to 50 acres in size. Most of these tracts are between the levee and the Mississippi River, but some are east of the levee.

In a typical profile the surface layer is about 12 inches of grayish-brown loamy sand. Beneath it is a thick layer of pale-brown sand or loamy sand.

Representative profile (about 1 mile east of the Mississippi River and 150 feet north of Tennessee Highway No. 79):

Ap--0 to 12 inches, grayish-brown (10YR 5/2) loamy sand; single grain; loose; pH 7.0.

C--12 to 60 inches, pale-brown (10YR 6/3) sand or loamy sand; single grain; loose; pH 7.0.

This sandy soil most commonly is between 3½ and 6 feet thick but is only 2 feet thick in a few places. A few tracts east of the levee are underlain by clay at a depth of 3 feet.

Where this soil occurs between the levee and the Mississippi River, it is next to Bruno, Robinsonville, and Adler soils. Where it occurs east of the levee, it is next to Bruno, Worthen, Tiptonville, Reelfoot, and Adler soils. Crevasse loamy sand has much more sand in the topmost 3½ feet than any of the adjacent soils.

The content of phosphorus and potassium is medium

to high. The reaction is neutral or mildly alkaline, so lime is not needed. Most nonlegume crops give fair to good response to nitrogen.

This soil has low available moisture holding capacity and is droughty. Floods from the Mississippi River cover about three-fourths of the acreage for 2 or 3 weeks nearly every year. Strong winds in spring cause duststorms if the soil is dry, but only the soil in the areas protected by the levee is likely to become dry enough to be blown.

Row crops are grown on this soil, but crop failure is common (pl. IV). Winter wheat is grown in the areas protected by the levee. Drought-resistant summer crops, such as sorghum, sunflowers, and watermelons, are grown in these areas in summer. In the unprotected areas, only summer crops can be grown; winter crops are killed by floods.

Stands of cottonwood and black willow are growing in many areas of recently deposited material. These woodlands help to retard floodwater.

Wildlife food plants, such as sunflowers, spurge, panicgrass, and sorghum, can be grown in summer. Small grain provides food in winter where flooding is not prevalent. (Capability unit IVs-1)

Iberia silt loam (0 to 2 percent slopes) (Ib).--This is a dark-colored, poorly drained, fertile soil on low, broad flats along the Mississippi River.

In a typical profile the surface layer is about 10 inches of very dark grayish-brown silt loam. Beneath this layer is several feet of gray and dark-gray, plastic clay.

Representative profile (about 0.75 mile north of Tiptonville):

Ap--0 to 5 inches, very dark grayish-brown (10YR 3/2) silt loam; moderate, medium, granular structure; friable; pH 7.5; abrupt, smooth boundary.

A12--5 to 10 inches, very dark grayish-brown (10YR 3/2) silt loam; few, fine, gray mottles; moderate, medium, granular structure; friable; pH 7.0; clear, smooth boundary.

Bg--10 to 30 inches, gray (10YR 5/1) clay; common, fine and medium, dark reddish-brown mottles; massive (structureless) to weak, medium, subangular blocky structure; firm when moist, plastic and sticky when wet; pH 7.5; clear, smooth boundary.

C--30 to 72 inches, dark-gray (N 4/0) clay; many, fine and medium, dark reddish-brown mottles; massive; firm when moist, plastic and sticky when wet; pH 7.5.

The texture is either silt loam or loam to a depth of 10 to 20 inches. The underlying material is clay to a depth of 6 feet or more in most places, but it consists of alternating layers of silt loam, silty clay loam, and clay below a depth of about 3 feet in some places.

This soil is next to Commerce soils, Sharkey clay, and Iberia silty clay loam. It has clay nearer the surface than Commerce soils, in which the depth to clay is at least 20 inches. Iberia silt loam has less clay in the surface layer than either Sharkey clay or Iberia silty clay loam.

Iberia silt loam is slightly acid to mildly alkaline. Lime is not needed. The content of phosphorus and potassium is medium to high. Crops in areas protected by the levee give fair to good response if fertilizer containing these elements is applied, but crops between the levee and the river give little or no response. Nonlegumes respond well to nitrogen.

Floodwater covers this soil for 2 or 3 weeks nearly every winter or spring. Runoff from higher areas collects after heavy rain, even in areas protected by a levee. This soil is wet all winter, even if no standing water is present. After the excess water drains away, tilth is good. Plants generally have a good supply of moisture because the available moisture holding capacity is high.

Soybeans is the main crop, but cotton and corn are grown also. Small grain and long-lived crops, such as alfalfa, generally cannot tolerate wetness of the soil in winter.

Drainage ditches help to remove the excess water from most places, but some tracts on either side of the levee cannot be drained when the river is high, because outlets are not available. Grading and smoothing would eliminate low spots and further improve surface drainage, but these practices generally are not used on tracts between the levee and the river, because the effects are destroyed by floodwater in a season or two.

Practically all of this soil has been cleared and is used for crops, but cottonwood, sycamore, oak, sweetgum, and black willow would grow rapidly.

Areas that can be protected from flooding can be used part of the time as reservoirs for raising fish and part of the time as cropland. Fish require water 2 to 6 feet deep. Levees are needed for impounding the water and for keeping floodwater out. Then a system of drainage is needed before crops can be planted. Johnsongrass and other weeds that interfere with crops would be killed while the water is impounded. The leveed areas could be managed also to attract waterfowl. Drainage would be needed in summer so that choice foods could be planted, and shallow flooding would be needed in fall and winter. (Capability unit IIw-4)

Iberia silty clay loam (0 to 2 percent slopes) (Ie).--This is a dark-colored, poorly drained, fertile soil on low, broad flats along the Mississippi River.

In a typical profile the surface layer is about 14 inches of very dark grayish-brown and very dark gray silty clay loam. Below this layer is several feet of dark-gray, plastic clay.

Representative profile (about 1.3 miles south of Tiptonville):

Ap--0 to 6 inches, very dark grayish-brown (10YR 3/2) silty clay loam; moderate, medium, granular structure; friable; pH 6.5; abrupt, smooth boundary.

A12--6 to 14 inches, very dark gray (10YR 3/1) silty clay loam; common, medium, dark-brown mottles; reddish-brown coatings on some ped

surfaces, in root holes, and in cracks; moderate, coarse, granular structure; firm when moist, plastic and sticky when wet; pH 6.5; clear, smooth boundary.

Bg--14 to 42 inches, dark-gray (10YR 4/1) clay; common, medium, distinct, dark-brown and dark reddish-brown mottles; weak, medium, angular blocky structure; firm when moist, plastic and sticky when wet; few fine pores; pH 7.0; gradual, smooth boundary.

Cg--42 to 72 inches, dark-gray (N 4/0) clay; many, medium, distinct, yellowish-brown and dark reddish-brown mottles; plastic and sticky; pH 7.0.

The A horizon ranges from 10 to 20 inches in thickness. It is clay loam in a few places. Generally, it is underlain by clay to a depth of 6 feet or more, but in a few places the material is clay to a depth of 3½ feet and, below that depth, alternating layers of silt loam, silty clay loam, and clay.

This soil is next to Iberia silt loam, Sharkey clay, Tunica soils, and Bowdre soils. Iberia silty clay loam has more clay in the surface layer than Iberia silt loam but less clay than the Sharkey soil. It is in somewhat lower places and is underlain by thicker deposits of clay than Tunica and Bowdre soils, both of which have more clay in the topmost 10 to 20 inches. Iberia silty clay loam is more poorly drained than Bowdre soils.

Iberia silty clay loam is slightly acid to mildly alkaline. Lime is not needed. The content of phosphorus and potassium is medium to high. Nevertheless, crops grown in areas protected by the levee show fair to good response if fertilizer containing these elements is applied. Crops grown in areas between the levee and river generally show little response, presumably because the supply of these elements is replenished by floodwater. All nonlegumes respond well to nitrogen.

Areas between the levee and the river are covered by floodwater for 2 or 3 weeks each winter or spring, and areas protected by the levee receive runoff from higher places. This water remains for a few days in some areas and for as long as 2 weeks in others. Even when it is not flooded, this soil is wet and sticky most of the winter and early in spring. It is easy to work when it is moist but not when it is wet or dry. It swells when wet; then it shrinks as it dries, and a network of cracks forms in the topmost 1 to 2 feet. Clay in the subsoil restricts the movement of air, water, and roots. The available moisture holding capacity is medium.

Most of this soil is used for row crops. The acreage of soybeans is more than that of all other crops combined. A few fields are used for cotton, and a few for corn. Summer crops that can be planted late, like soybeans, are best suited. Winter crops, such as small grain, and long-lived perennials, such as alfalfa, generally are killed by excess water in winter and spring.

Excess water and the clayey nature of this soil are the main limitations. Flooding and standing water cannot be prevented by individual landowners. Drainage ditches help to remove the excess water from most places, but some tracts on each side of the levee cannot be drained when the river is high, because outlets are not available. Smoothing and grading would eliminate low spots and further improve surface drainage, but these measures generally are not practical between the levee and the river, because the effects are destroyed by floods in a year or two.

Little of this soil is wooded, but cottonwood, sycamore, oak, and black willow would grow rapidly.

Areas that are not subject to severe flooding can be used part of the time as reservoirs for raising fish and part of the time as cropland. Fish require water 2 to 6 feet deep. Levees are needed for impounding the water and for keeping floodwater out. Then a system of drainage is needed before crops, such as soybeans and corn, can be planted. Johnsongrass and other weeds that interfere with crops would be killed while the water is impounded. The leveed areas could also be managed to attract waterfowl. (Capability unit IIw-4)

Levees and Borrow Pits (Lb).--This mapping unit consists of the levee and the borrow pit from which soil material was removed to build the levee. It forms a nearly continuous strip that extends north and south from one end of the county to the other. It is interrupted in the northern part of the county by a ridge that forms a natural levee. The levee is 8 miles east of the river in the southwestern part and only a few feet east in several places. The average distance is 3 miles.

The levee is about 300 feet wide at the bottom and between 15 and 20 feet wide at the top. It is 20 to 30 feet high and has steep sides. A road, parts of which have been graveled, runs along the top. The borrow pit is along the western edge of the levee. It is about 300 feet wide and between 5 and 15 feet deep. Some segments of it hold water all year. The texture of the soil material, both on the levee and in the borrow pit, ranges from sand to clay.

The levee provides a refuge for livestock and wildlife during floods. Grass on both sides of the levee provides some grazing. Cottonwoods, willows, and weeds grow in the segments of the borrow pit that dry out. The ponded segments attract waterfowl and generally contain rough fish. Because of the annual floods, little can be done to manage the fish population. (Capability unit VIe-1)

Mhoon clay (0 to 1 percent slopes) (Mh).--This is a fertile but poorly drained soil on low flats that border Reelfoot Lake. It is only 1 or 2 feet above the normal lake level.

In a typical profile the uppermost layer is about 12 inches of gray clay. The underlying material consists of gray silt loam and silty clay loam.

Representative profile (about 3 miles north of Tiptonville and about 1 mile east of Tennessee Highway No. 78):

C1--0 to 12 inches, gray (N 5/0) clay; many, medium, grayish-brown and yellowish-brown mottles;

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firm when moist, plastic and sticky when wet; massive; pH 7.0; abrupt, smooth boundary.

IIC2--12 to 48 inches, gray (N 5/0) silt loam; many, medium, grayish-brown and yellowish-brown mottles; massive; friable; pH 7.0; clear, smooth boundary.

IIC3--48 to 54 inches, gray (10YR 5/1) silty clay loam; many, medium, yellowish-brown mottles; massive; friable; pH 7.0.

The gray clay extends to a depth of about 8 to 18 inches. Below this is silt loam, loam, silty clay loam, or fine sandy loam or alternating layers of these textures.

This soil is at the same elevation as Swamp and Sharkey clay and is next to but slightly lower than Bowdre silty clay and Tunica clay. Mhoon clay is flooded for shorter periods than Swamp. It is more poorly drained than the Bowdre soils.

Mhoon clay is neutral or mildly alkaline.

Water stands on the surface most of the winter and spring, and the water table is seldom more than a few inches below the surface. Because it is wet continuously, this soil is unsuitable for row crops, hay, or pasture.

Cypress, sweetgum, bottom-land oak, and other water-tolerant trees grow well, though the high water table restricts root growth and causes some windthrow of oak trees (pl. IV). Logging is restricted to dry periods in summer and fall.

Flooding and standing water make this soil an ideal waterfowl habitat. Willow oak and water oak produce good food for ducks, and the acreage generally is flooded all during the duck-hunting season. Canebrakes next to open spots provide food and cover for deer during the hot summers, but deer cannot remain on this wet soil during winter and spring. (Capability unit VIIw-1)

Reelfoot silt loam (0 to 2 percent slopes) (Re).--This is a deep, somewhat poorly drained soil on broad flats in the eastern two-thirds of the county. It formed in silty and loamy sediments from the Mississippi River.

In a typical profile the surface layer is about 14 inches of silt loam that is very dark grayish brown in the upper part and very dark gray in the lower part. The subsoil, about 24 inches thick, is yellowish-brown silty clay loam and silt loam and is highly mottled with gray. The underlying material is mottled gray and brown loam.

Representative profile (northwest corner of Lake Isom National Wildlife Refuge):

Ap--0 to 7 inches, very dark grayish-brown (10YR 3/2) silt loam; moderate, medium, granular structure; friable; pH 6.5; abrupt, smooth boundary.

A12--7 to 14 inches, very dark gray (10YR 3/1) silt loam; moderate, medium, granular structure; friable; pH 6.5; clear, smooth boundary.

B2t--14 to 26 inches, yellowish-brown (10YR 5/4) silty clay loam; many, medium, grayish-brown and dark grayish-brown mottles; moderate, medium, subangular blocky structure; friable; clay films on vertical and horizontal surfaces of peds; pH 5.0; gradual, smooth boundary.

B3--26 to 38 inches, yellowish-brown (10YR 5/4) silt loam; many, medium, gray mottles; weak, medium, subangular blocky structure; friable; few clay films; pH 5.0; gradual, smooth boundary.

C--38 to 72 inches, mottled gray (10YR 5/1) and brown (10YR 4/3) loam; massive; very friable; pH 5.5.

The dark-colored surface layer ranges from 10 to 20 inches in thickness. It is commonly silt loam, but in a few places is loam or very fine sandy loam. The B horizon commonly is silty clay loam or silt loam, but in places it is clay loam or loam. Mottles in this layer range from gray to dark grayish brown.

This soil occurs with Commerce silt loam, in positions slightly lower than those of the Worthen, Tiptonville, and Adler soils. This soil has a darker colored surface layer and a more yellow, more acid subsoil than the Commerce and Adler soils. It is not so well drained as the Adler, Tiptonville, and Worthen soils.

The surface layer of Reelfoot silt loam is slightly acid to neutral. Generally lime is not needed. The content of phosphorus and potassium is medium to high, but crops respond well if fertilizer containing these elements is applied. All nonlegume crops show good response to nitrogen.

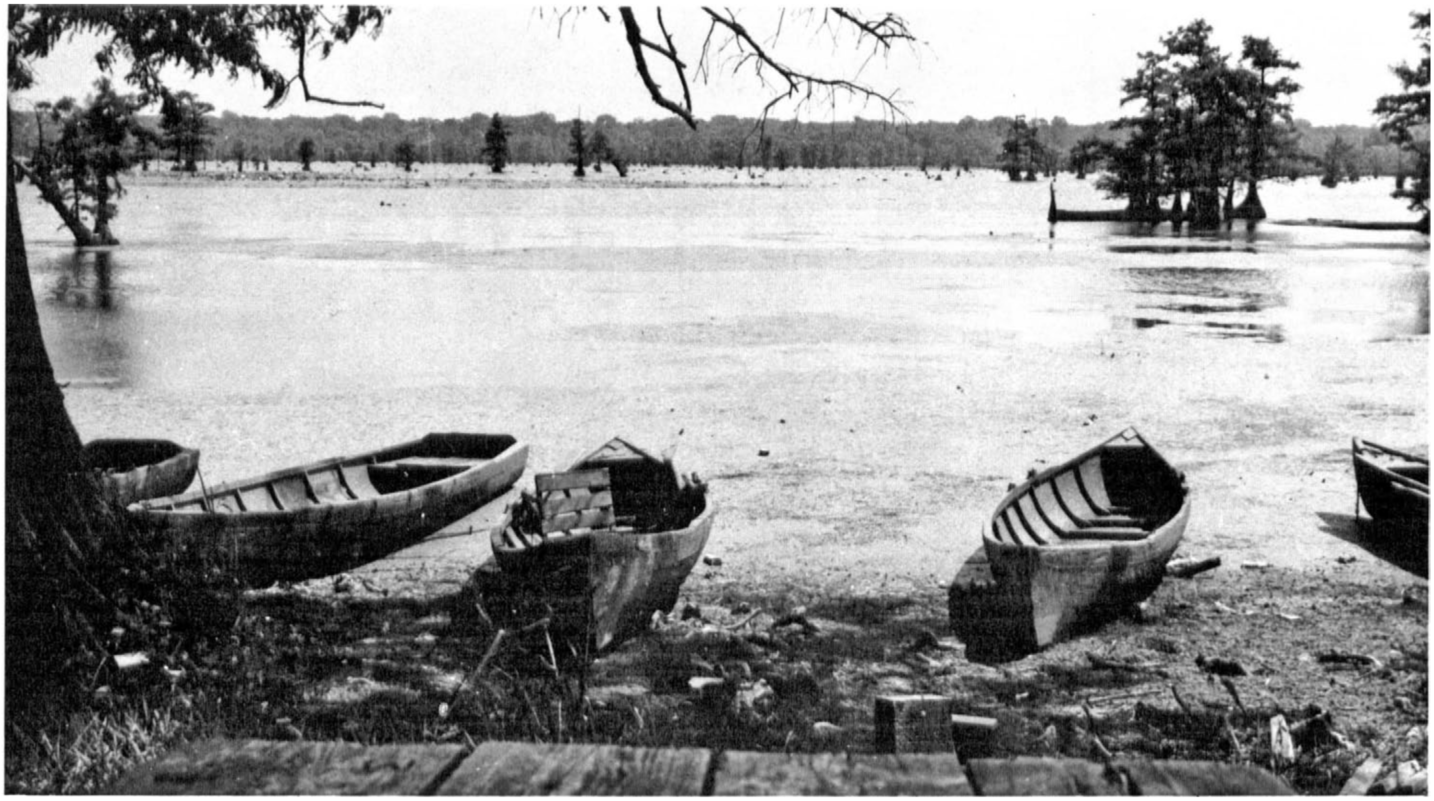
This soil is not flooded by the river, but in places a few inches of runoff from higher areas collects. This water drains away in only a few hours. The soil is wet for several weeks in winter, but in spring the water drains away and the soil is then in good tilth and easily worked. Roots, water, and air penetrate easily. Plants generally have a good supply of moisture because the available moisture holding capacity is high.

Soybeans are the main crop, but some tracts are planted to cotton and corn. Alfalfa and wheat are grown in a few large fields where this soil occurs with soils that are better drained.

Excess water is the main limitation. Nevertheless, cotton, corn, soybeans, and similar summer annuals do well and can be grown every year. Long-lived perennials, such as alfalfa, and winter crops, such as wheat, grow well only in areas where water does not remain for long periods. Even in these, the crops are damaged during years of unusually high rainfall. Drainage ditches remove most of the excess water, but some grading or smoothing would eliminate the pockets or depressions in which water stands.

Little of this soil is wooded, though it could produce high yields of bottom-land oaks, green ash, cottonwood, and sweetgum.

Excellent food and cover for wildlife can be provided by improving areas between fields, on ditchbanks, and in field corners. Summer annuals, such as sorghum, could be planted to attract quail. (Capability unit I-2)



Blue Basin of Reelfoot Lake, a favorite spot for hunting and fishing, attracts sportsmen from several States.

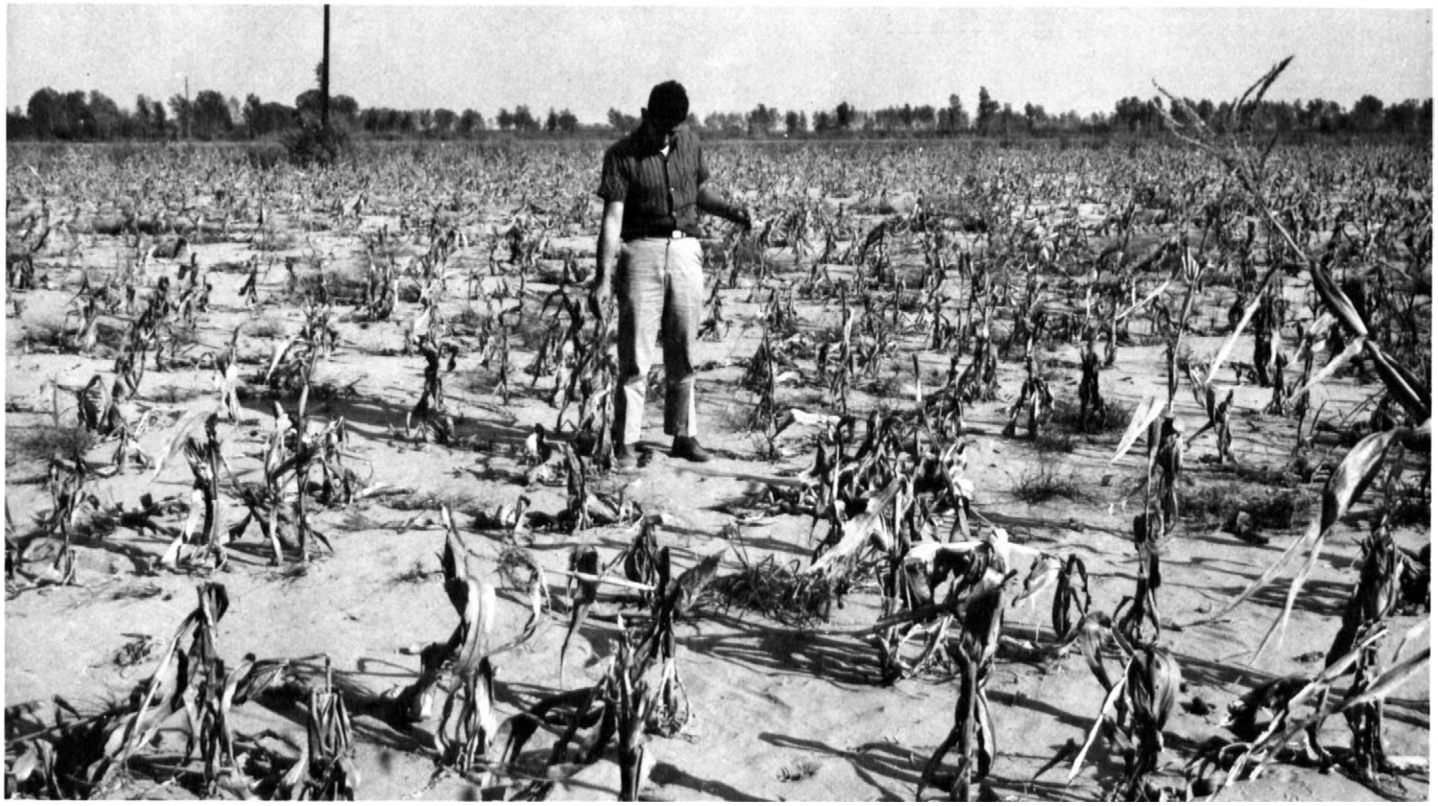
Runoff, on its way toward the Mississippi River, has drained from the Worthen and Tiptonville soils in the foreground onto Reelfoot soils in the background.

The Mississippi River has scoured out holes, such as this one in soil association 1. The holes are several feet deep and range from 2 to 10 acres in size.

Swift floodwater carries sand from the scoured-out areas and deposits it in unprotected areas of soil association 1.

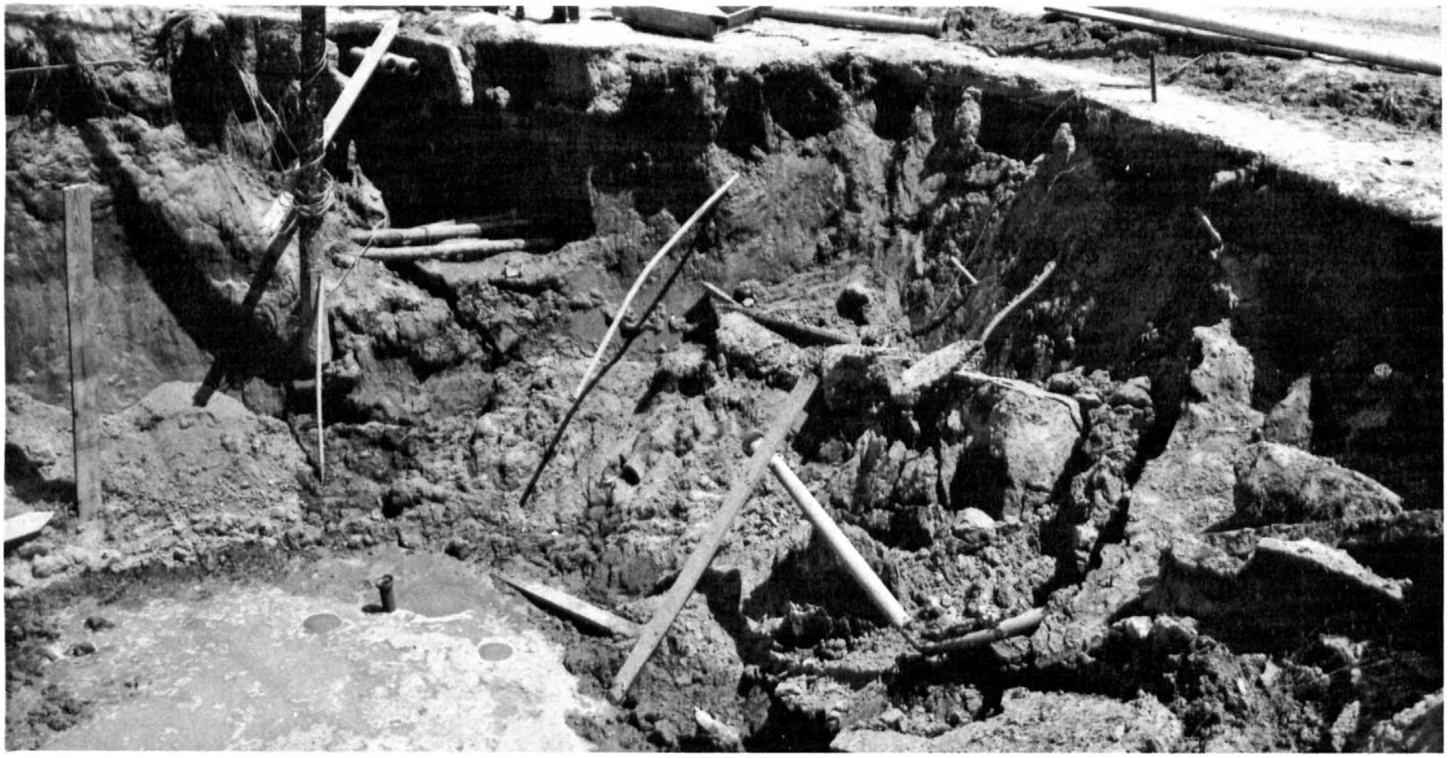
This area of Bruno sandy loam, which is along the Mississippi River, is flooded nearly every winter and spring and is droughty in summer.

This area of Commerce silt loam near Ridgely is well suited to irrigated cotton.



Crop failure is common on Crevasse loamy sand, which is a droughty soil.

Windthrow is a severe hazard in this area of Mhoon clay because a high water table hinders root development.



Engineering devices are difficult to construct in some areas of Robinsonville soils. The earth caves in, and layers of quicksand are common below a depth of 6 feet.

Sharkey clay tends to be cloddy and difficult to work because of the high clay content and poor drainage.

Cypress trees grow well in wet areas of Tunica clay, frequently flooded.

Roadside ditches help to remove excess water from roadways and also are an important part of the drainage system in Lake County.

Grading and smoothing help to eliminate low spots and to lead excess water into drainage ditches.
The soil is Commerce silt loam, frequently flooded.

Reelfoot silty clay loam (0 to 2 percent slopes) (Rf).--This is a deep, fertile, somewhat poorly drained soil that formed in sediments deposited by the Mississippi River.

In a typical profile the surface layer is about a foot of very dark grayish-brown silty clay loam. The subsoil consists of yellowish-brown silty clay loam over dark-gray silty clay loam or clay loam. Below a depth of 3 to 4 feet is dark-gray clay. Gray mottles just beneath the plow layer indicate excess wetness.

Representative profile (about 2.5 miles northeast of Ridgely and 0.25 mile west of Lake Isom):

Ap--0 to 7 inches, very dark grayish-brown (10YR 3/2) silty clay loam; moderate, fine, granular structure; friable when moist, slightly plastic and sticky when wet; pH 6.0; abrupt, smooth boundary.

A12--7 to 13 inches, very dark grayish-brown (10YR 3/2) silty clay loam; common, medium, dark-gray mottles and few, medium, dark-brown mottles; moderate, coarse, granular structure; friable when moist, slightly plastic and sticky when wet; pH 6.0; gradual, smooth boundary.

B2t--13 to 36 inches, yellowish-brown (10YR 5/4) silty clay loam; many, medium, dark-gray mottles; moderate, medium, subangular blocky structure; friable; pH 6.0; common, fine, dark-colored concretions; gradual, smooth boundary.

B3--36 to 44 inches, dark-gray (10YR 4/1) silty clay loam or clay loam; common, medium, gray and yellowish-brown mottles and few, medium, dark-brown mottles; weak, medium, subangular blocky structure; friable; pH 6.5; common, fine, dark-colored concretions; clear, smooth boundary.

IIC1--44 to 60 inches, dark-gray (10YR 4/1) clay; common, medium, dark yellowish-brown mottles; massive; firm when moist, plastic and sticky when wet; pH 7.0; clear, smooth boundary.

IIIC2--60 to 72 inches, gray (10YR 5/1) silt loam; many, medium, dark yellowish-brown mottles; massive; friable; pH 7.0.

The A horizon ranges from 10 to 20 inches in thickness. Small "sand blows," or spots of loamy sand or sand, occur in a few areas. The topmost 3 feet commonly is silty clay loam, but it is clay loam in some areas. The texture is variable below a depth of 3 feet; it ranges from fine sandy loam to clay.

This soil is next to Iberia and Commerce soils. It is better drained than Iberia soils and has less clay between depths of 20 and 40 inches. It has a yellower, more acid subsoil to a depth of about 3 feet than either Iberia or Commerce soils.

Reelfoot silty clay loam has a slightly acid or neutral surface layer and so does not need lime. The supply of phosphorus and nitrogen is high, but crops respond well if fertilizer containing these elements is applied. Nonlegumes respond well to nitrogen.

A few inches of water from higher places collects on the surface and remains for a few hours on the higher spots and for 1 or 2 days on the lower spots. The soil remains wet and is slightly sticky most of the winter, but the excess water drains away in spring and the soil then is in fairly good tilth and is easy to work. Plants generally have a good supply of moisture in summer because the available moisture holding capacity is high.

Summer annuals that can be planted late are well suited. Soybeans is the main crop. Cotton and corn are grown in a few fields, but they have to be planted late because the soil dries out slowly. Long-lived plants, such as alfalfa, and winter crops, such as wheat, generally cannot survive the wet winters.

After low spots have been eliminated by grading or smoothing, drainage ditches remove standing water, but not all the excess water in the soil in winter can be eliminated.

Little of the acreage is wooded, but this soil could produce high yields of oak, cottonwood, green ash, and sweetgum.

Food and cover for wildlife can be provided in odd-shaped areas between fields, on ditchbanks, and in field corners. Summer annuals grow in abundance. (Capability unit IIw-2)

Reelfoot-Bruno Complex (0 to 2 percent slopes) (Rb).--This complex is mostly in the southeastern corner of the county. Each tract consists predominantly of silty Reelfoot soil, but each includes small, irregular spots of very sandy Bruno soil.

The Reelfoot soil has a dark-colored surface layer that most commonly is silt loam but is fine sandy loam or silty clay loam in places. This layer ranges from 10 to 20 inches in thickness. It is slightly acid or neutral. The subsoil is silty clay loam and silt loam in most places but is clay loam or loam in some. It has yellowish-brown and gray mottles to a depth of 3½ feet. These mottles indicate excessive wetness.

The Bruno soil generally consists of 2 to 6 feet of loamy sand or sand, but it has layers of sandy loam about 1 foot thick in some areas. It formed in very sandy sediment from the Mississippi River and occurs as sand spots. But not all of the sand spots in this complex consist of Bruno soil. Some were deposited by boils or eruptions during violent earthquakes in 1811 and 1812, and some formed as a result of major floods.

This complex is next to Reelfoot silt loam and Reelfoot silty clay loam.

Reelfoot-Bruno Complex is slightly acid or neutral in reaction. Lime generally is not needed. The content of phosphorus is medium to high. Nevertheless, crops on the Reelfoot soil respond well if fertilizer containing these elements is applied. Crops on the Bruno soil show little response. Nonlegume crops on both soils respond well to nitrogen.

Water from higher areas collects on the Reelfoot soil after heavy rains and remains for a few hours. This soil is wet almost all winter. After the excess water drains away in spring, this soil is easy to work and to keep in good tilth. Roots, water,

and air penetrate readily. Plants generally have a good supply of moisture because the available moisture holding capacity is high.

The Bruno soil dries out quickly after each rain and is easy to work. It is so dry and loose in summer that tractors and other machinery cannot be used in some areas. The available moisture holding capacity is low, and plants have plenty of moisture for only a few days after rains.

Cropland management is difficult because of the contrasting nature of the soils. Summer crops are better suited than winter crops. Winter crops, such as wheat, and long-lived perennials, such as alfalfa, cannot tolerate winter wetness and are poorly suited. Soybeans, cotton, corn, and other summer crops grow well on the Reelfoot soil but not on the very sandy, droughty Bruno soil.

Excess water is the main limitation of the Reelfoot soil; droughtiness is the main limitation of the Bruno soil. Drainage ditches remove some of the excess water. Grading or smoothing eliminates low spots and thus improves surface drainage. These practices also eliminate or reduce the size of some sand spots.

Practically all of this complex has been cleared, but the Reelfoot soil could produce good yields of many kinds of hardwoods, and the Bruno soil could produce fair to medium yields of cottonwood, black willow, and hackberry.

Most of the plants suited to the climate can be grown as food and cover for wildlife on the Reelfoot soil unless water stands on the surface for long periods. Small grain in winter and sunflowers and sorghum in summer provide good food on the droughty Bruno soil. (Capability unit IIIs-1)

Robinsonville fine sandy loam, frequently flooded (0 to 2 percent slopes) (Rm).--This is a well-drained, fertile soil between the levee and the Mississippi River. It generally occurs as strips along the river.

In a typical profile the surface layer is about 8 inches of dark grayish-brown fine sandy loam. Below this layer is several feet of dark grayish-brown and brown loam, fine sandy loam, and silt loam.

Representative profile (about 0.5 mile north of Hathaway Church):

Ap--0 to 8 inches, dark grayish-brown (10YR 4/2) fine sandy loam; weak, fine, granular structure; very friable; pH 7.5; abrupt, smooth boundary.

C1--8 to 18 inches, dark grayish-brown (10YR 4/2) loam; weak, medium, granular structure; very friable; pH 7.5; clear, smooth boundary.

C2--18 to 40 inches, brown (10YR 4/3) fine sandy loam; massive or single grain; very friable; pH 7.5; clear, smooth boundary.

C3--40 to 48 inches, brown (10YR 4/3) silt loam; few, medium, grayish-brown mottles; massive; very friable; pH 7.5; clear, smooth boundary.

C4--48 to 72 inches, dark grayish-brown (10YR 4/2) fine sandy loam; common, medium, gray mottles; massive; very friable; pH 7.5.

The surface layer is very dark grayish brown in some places. The topmost 3 feet or more of the profile commonly consists of alternating layers of silt loam, loam, and fine sandy loam. Loamy sand or sand occurs at a depth of 3 to 6 feet in some spots (pl. V).

This soil is next to Adler, Commerce, Crevasse, and Bruno soils. It has more sand throughout than Adler and Commerce soils and is better drained than Commerce soils. It has less sand, especially in the uppermost 3 feet, than Bruno and Crevasse soils.

This Robinsonville soil is neutral or mildly alkaline in reaction and so does not need lime. The content of phosphorus and potassium is high. Nonlegume crops, such as cotton and corn, give excellent response to nitrogen.

Floodwater from the Mississippi River covers this soil for 2 or 3 weeks nearly every year. After the excess water drains away, the soil is easy to work and to keep in good tilth. Roots, water, and air penetrate readily. Plants generally have a good supply of moisture because the available moisture holding capacity is high. A few areas have a sandy substratum and are slightly droughty.

Practically all of this soil has been cleared and is used to grow cotton, corn, and soybeans. A few wooded strips have been left along the riverbanks to break the scouring force of floodwater.

Cotton, corn, and soybeans are well suited because they are summer crops that can be planted after the floodwater drains away. Winter crops and long-lived perennials, such as alfalfa, are killed by the floods.

The flood hazard, which is the most serious limitation, cannot be reduced. Erosion is not a hazard.

Little of this soil is wooded, but it could produce good yields of many kinds of hardwoods.

Abundant food and cover for wildlife can be grown if plants that withstand flooding in winter and spring are selected. (Capability unit IIw-1)

Sharkey clay (0 to 1 percent slopes) (Sa).--This is a fertile but poorly drained soil. It formed in thick beds of clay deposited by ponded water from the Mississippi River.

In a typical profile the surface layer is about 6 inches of very dark grayish-brown, plastic clay. Beneath this layer is several feet of dark-gray, plastic clay.

Representative profile (about 1 mile south of Tiptonville):

Ap--0 to 6 inches, very dark grayish-brown (10YR 3/2) clay; many, medium, dark-gray and dark-brown mottles; massive (structureless) to weak, coarse, granular structure; firm when moist, sticky and plastic when wet; pH 6.5; abrupt, smooth boundary.

C1--6 to 40 inches, dark-gray (N 4/0) clay; common, medium, dark yellowish-brown mottles; massive (structureless) to weak, coarse, granular structure; firm when moist, sticky and plastic when wet; pH 7.0; gradual, smooth boundary.

C2--40 to 72 inches, dark-gray (N 4/0) clay; many, medium and coarse, yellowish-red and dark yellowish-brown mottles; massive; firm when moist, sticky and plastic when wet; pH 7.0.

The texture generally is clay to a depth of more than 6 feet, but in a few spots the clay is underlain at a depth of 40 inches by alternating layers of silt loam, silty clay loam, and clay. Small concretions of calcium carbonate occur in a few places.

Sharkey clay is next to Swamp and Iberia, Tunica, Mhoon, and Bowdre soils. It has more clay in the surface layer than Iberia soils and formed in thinner deposits of clay than Tunica, Bowdre, and Mhoon soils. It is more poorly drained than Bowdre soils.

The reaction generally is neutral but ranges from slightly acid to mildly alkaline. Lime is not needed. The content of phosphorus and potassium is medium to high, but crops in areas protected by the levee generally show fair to good response if fertilizer containing these elements is applied. Crops in areas between the levee and the river show only slight response. All nonlegumes respond well to nitrogen.

Where this soil occurs between the levee and the river, it is covered by floodwater for 2 or 3 weeks each winter or spring. Where it is protected by the levee, it receives water from higher areas. In all areas, the soil stays wet and sticky for several days after the surface water has drained away. It is generally too wet to work in winter and early in spring and is hard, cloddy, and difficult to work when it dries out in summer (pl. V). It is fairly easy to work when moist in spring. This soil swells when wet and shrinks as it dries. As a result, cracks as much as 2 inches wide and 1 to 2 feet deep form. These cracks damage roots in some places. The movement of roots, water, and air is restricted. The available moisture holding capacity is medium.

Most of the acreage has been cleared; the chief crop is soybeans. Cotton and corn grow only fairly well.

This soil cannot be used for crops unless drainage ditches are dug to remove surface water. Grading or smoothing would eliminate low spots and further improve drainage. Ditches, grading, and smoothing, however, are likely to be effective for only one or two seasons in areas between the levee and the river, because of the effects of sediment-bearing floodwater.

Good seedbeds are difficult to prepare. Many farmers like to break the plow layer in fall, when it is moist or dry, and let rain action, freezing, and thawing break up the clods in winter. Then, a good seedbed can be prepared with little difficulty in spring. The response to preemergence weed sprays is only fair, especially if the seedbed is poorly prepared.

A few very low areas of Sharkey clay are in the woodlands bordering Reelfoot Lake. These areas are not suitable for crops or pasture, but they produce good yields of water-tolerant trees, such as cypress and bottom-land oaks. Logging is restricted to summer and fall.

The low areas near Reelfoot Lake produce food and cover for waterfowl. Water stands in these areas during the hunting season nearly every year. In the open areas are canebrakes and wild grasses, which provide cover and food for deer in summer. Deer cannot remain in these areas in winter, because of the flooding.

Areas that are not subject to severe flooding can be used part of the time as reservoirs for raising fish and part of the time as cropland. Fish require water 2 to 6 feet deep. Levees are needed for impounding the water and for keeping floodwater out. Then a system of drainage is needed so that crops such as soybeans and corn can be planted. Johnsongrass and other weeds are killed while the water is impounded. The leveed areas could be managed also to attract waterfowl. Drainage would be needed in summer so that choice foods could be planted, and shallow flooding would be needed in fall and winter. (Capability unit IIIw-2)

Swamp (0 to 1 percent slopes) (Sw).--Swamp consists of low, wooded areas on which 1 to 3 feet of water stands from late in fall, through winter and spring, and into summer. During especially wet years, water remains on some tracts the year around. Near Reelfoot Lake, the water table remains at or near the surface during summer. In other places, it drops to a depth of as much as 3 feet during extended dry periods. The soil material generally is clay to a depth of 6 feet. It is colored with various shades of gray and is neutral or alkaline in reaction.

The vegetation consists of water-tolerant plants, among them cypress and willow trees and scattered tupelo trees. Growth is slow, and logging is difficult.

Although food for waterfowl is scarce, water and cover are plentiful, and areas of Swamp are choice spots for duck hunting. In summer deer bed down where water near the surface keeps the earth cool. (Capability unit VIIw-1)

Tiptonville silt loam (0 to 2 percent slopes) (Ta).--This is a deep, moderately well drained soil scattered in high places through the eastern two-thirds of the county. It formed in silty and loamy sediments from the Mississippi River.

In a typical profile the surface layer is about 12 inches of very dark grayish-brown silt loam. The subsoil to a depth of about 45 inches is brown silty clay loam and silt loam. Grayish-brown mottles occur at a depth of about 2 feet.

Representative profile (0.75 mile north of Ridgely):

Ap--0 to 7 inches, very dark grayish-brown (10YR 3/2) silt loam; moderate, medium, granular structure; very friable; pH 6.5; abrupt, wavy boundary.

A1--7 to 12 inches, very dark grayish-brown (10YR 3/2) silt loam; moderate, medium, granular structure; very friable; pH 6.5; clear, wavy boundary.

B21t--12 to 21 inches, brown (10YR 4/3) silty clay loam; few, medium, faint, brown mottles and

coatings on the ped surfaces; moderate, medium, subangular blocky structure; friable; patchy, discontinuous clay films; pH 6.5; clear, wavy boundary.

B22t--21 to 32 inches, brown (10YR 5/3) silt loam; common, medium, grayish-brown and yellowish-brown mottles; moderate, medium, subangular blocky structure; friable; patchy, thin clay films; pH 5.0; clear, smooth boundary.

B3--32 to 45 inches, brown (10YR 4/3) silt loam; many, medium, yellowish-brown and grayish-brown mottles; weak, medium, subangular blocky structure; friable; pH 5.0; clear, smooth boundary.

C--45 to 72 inches, grayish-brown (10YR 5/2) silt loam; common, medium, yellowish-brown mottles; massive; friable; common, fine, dark-colored concretions; pH 5.0.

The dark-colored surface layer ranges from 10 to 15 inches in thickness. In a few places it is very fine sandy loam instead of silt loam, and in spots it approaches silty clay loam. The B horizon extends to a depth of 3 to 4 feet; it commonly is silty clay loam, but it ranges to silt loam, clay loam, or loam.

This soil is at the higher elevations, along with Worthen silt loam and Adler silt loam. It lies next to Reelfoot silt loam and Commerce silt loam, which generally are at slightly lower elevations. This soil is better drained than the Reelfoot and Commerce soils, but not so well drained as the Worthen soils. It has a darker surface soil and a more acid subsoil than the Adler and Commerce soils, which lack a B horizon.

The surface layer of this soil has a medium to high content of phosphorus and potassium, but most crops respond to additions of these elements in fertilizer. All nonlegumes show excellent response to nitrogen.

Roots, water, and air readily penetrate this soil, which is easy to work and to keep in good tilth. Plants nearly always have a good supply of moisture. Little water runs off.

Nearly all of this soil is used for row crops, mainly cotton, corn, and soybeans. Alfalfa is grown in a few fields, and also some winter wheat. The winter wheat is followed by soybeans planted late in spring. This soil produces well if only those good practices ordinarily used in the county are applied.

All the acreage has been cleared, but sweet pecan, cherrybark oak, black walnut, and cottonwood trees would grow rapidly.

This soil can produce abundant nutritious food for wildlife. Fence rows, ditchbanks, and odd-shaped areas are good sites for wildlife plantings. (Capability unit I-1)

Tunica clay (0 to 2 percent slopes) (Tc).--This is a poorly drained soil that occurs in low places scattered through the eastern two-thirds of the county. It formed in ponded water from the Mississippi River.

In a typical profile the surface layer is about 5 inches of very dark grayish-brown clay. Beneath this layer is about 19 inches of dark-gray clay underlain by dark grayish-brown very fine sandy loam or loam. Gray mottles below the plow layer indicate wetness.

Representative profile (1.5 miles north of Tiptonville):

Ap--0 to 5 inches, very dark grayish-brown (10YR 3/2) clay; moderate, medium, granular structure; firm when moist, plastic and sticky when wet; pH 7.0; abrupt, smooth boundary.

C1--5 to 24 inches, dark-gray (10YR 4/1) clay; few, fine, yellowish-brown mottles; massive; firm when moist, plastic and sticky when wet; pH 7.5; abrupt, smooth boundary.

IIC2--24 to 72 inches, dark grayish-brown (10YR 4/2) very fine sandy loam or loam; few, medium, gray mottles; weak, fine, granular structure to massive (structureless); very friable; pH 7.0.

The clayey layer extends to a depth of 20 to 40 inches but commonly is about 24 inches thick. The underlying material, to a depth of about 6 feet, generally consists of silt loam, loam, very fine sandy loam, fine sandy loam, or silty clay loam, but commonly it consists of alternating layers of two or more of these textures. A few small, narrow, crooked strips are underlain by loamy sand or sand. Small areas are underlain by clay below a depth of 4 feet.

This soil is next to Sharkey clay, Bowdre silty clay, and Iberia soils. Tunica clay formed in thinner beds of clay than the Sharkey soil. It formed in thicker beds and is not so well drained as the Bowdre soil. Tunica clay has more clay in the surface layer than Iberia soils, which formed in thicker deposits of clay.

Tunica clay is neutral to mildly alkaline in reaction and does not need to be limed. The content of phosphorus and potassium is high.

This soil is difficult to work when wet because it is plastic and sticky, and when dry because it is hard and cloddy, but when moist it has fair tilth and is easy to work. It swells when wet and shrinks as it dries. When it shrinks, it forms a network of 1- to 2-inch cracks, which cause some damage to roots. Movement of air, water, and roots is slow because of the clayey texture.

This soil is wet and consequently is sticky and plastic most of the winter and spring. Water from higher areas collects in these areas and remains for several hours. Plants generally have an adequate supply of moisture because the available moisture holding capacity is medium.

Excess water and the clayey texture make this soil difficult to manage. Surface drainage can be improved by ditches and by elimination of low spots through grading or smoothing. A clod-free seedbed can be prepared if the plow layer is broken when it is moist or dry in fall. Rain action and freezing and thawing break down the clods in winter, and then a good seedbed can be prepared with little difficulty in spring. A cloddy, poorly prepared seedbed results in a poor stand of crops and reduces the

effectiveness of preemergence weed sprays.

The main crop is soybeans. Some cotton and corn are grown.

Little of this soil is wooded, but cottonwood, sweetgum, and swamp white oak would grow rapidly.

Tunica clay can be used part of the time as reservoirs for raising fish and part of the time as cropland. Fish require water 2 to 6 feet deep. Levees are needed for impounding the water and for keeping floodwater out. Then a system of drainage is needed before crops such as soybeans and corn can be planted. Johnsongrass and other weeds that interfere with crops would be killed while the water is impounded. The leveed areas could also be managed to attract waterfowl. (Capability unit IIIw-2)

Tunica clay, frequently flooded (0 to 2 percent slopes) (Tu).--This is a fertile but poorly drained soil that occurs on low, broad flats between the levee and the Mississippi River, where flooding is severe.

In a typical profile the surface layer is about 6 inches of very dark grayish-brown clay. Beneath this layer is about 22 inches of dark-gray clay underlain by dark grayish-brown silt loam. Gray mottles below the plow layer indicate wetness.

Representative profile (about 1.25 miles west of the levee and 2 miles south of Tennessee Highway No. 79):

Ap--0 to 6 inches, very dark grayish-brown (10YR 3/2) clay; weak, fine, granular structure; firm when moist, plastic and sticky when wet; pH 7.0; abrupt, smooth boundary.

C1--6 to 28 inches, dark-gray (10YR 4/1) clay; common, medium, dark grayish-brown mottles and few, medium, dark-brown mottles; massive; firm when moist, plastic and sticky when wet; pH 7.0; abrupt, smooth boundary.

IIC2--28 to 72 inches, dark grayish-brown (10YR 4/2) silt loam; common, medium, gray mottles and few, fine, dark-brown mottles; massive; friable; pH 7.0.

The clayey layer extends to a depth of 20 to 40 inches but commonly is 25 to 30 inches thick. The underlying material, to a depth of 6 feet, consists of silt loam, loam, fine sandy loam, or silty clay loam, but generally it consists of alternating layers of two or more of these textures.

This soil is next to Sharkey clay; Bowdre silty clay, frequently flooded; and Iberia soils. It formed in thicker deposits of clay than the Sharkey soil and Iberia soils and has more clay below a depth of 40 inches. It has more clay in the topmost 20 inches than Iberia soils. Tunica clay, frequently flooded, formed in thicker deposits of clay than the Bowdre soil, in which clayey material extends to a depth of less than 20 inches.

This Tunica soil is neutral or mildly alkaline in reaction and does not need lime. The content of phosphorus and potassium is high, and crops show little response if fertilizer containing these elements is applied. Nonlegumes respond well to nitrogen.

This soil is sticky and plastic when wet and hard and cloddy when dry, but when moist it is fairly easy to work. It swells when wet and shrinks as it dries. When it shrinks it forms a network of cracks that are up to 2 inches wide. These cracks do some damage to roots. Movement of water, air, and roots is slow because of the clayey texture.

Floodwater from the Mississippi River covers this soil for 2 or 3 weeks nearly every spring. The water drains away in time for soybeans to be planted, but planting of cotton and corn has to be delayed in some years. Plants generally have an adequate supply of moisture because the available moisture holding capacity is medium.

Because of flooding and wetness, only summer annuals grow well. The main crop is soybeans, which can be planted late in spring. Cotton and corn grow well only in the better drained spots.

Crop selection is important because little can be done to reduce the flood hazard. Drainage ditches help to remove excess water after the floods recede, but ditches become filled with sediment and lose their effectiveness in a few years. Because of the annual floods, smoothing and grading are not common practices.

About half of this soil is wooded. The stands consist mainly of bottom-land oaks, hackberry, sweetgum, sycamore, black willow, and cottonwood. Cypress grows in the wettest areas (pl. V). All of these trees grow rapidly. Logging equipment cannot be used in the months of November through April, because of the floods and the sticky, plastic nature of the surface layer.

Abundant food and cover for wildlife can be produced. Wild grasses, smartweed, saw briers, and cane grow well where the tree cover is sparse. Areas that can be flooded make ideal habitat for waterfowl. (Capability unit IVw-1)

Worthen silt loam (0 to 2 percent slopes) (Wo).--This is a deep, fertile, well-drained soil in the highest parts of the county, which are in the eastern half. It formed in silty and loamy sediments deposited by the Mississippi River.

In a typical profile the surface layer is about 17 inches of silt loam that is very dark grayish brown in the upper part and very dark brown in the lower part. Below this layer is several feet of brown or dark-brown silt loam or loam.

Representative profile (0.75 mile north of Ridgely):

Ap--0 to 8 inches, very dark grayish-brown (10YR 3/2) silt loam; moderate, fine, granular structure; very friable; pH 6.0; clear, smooth boundary.

A12--8 to 17 inches, very dark brown (10YR 2/2) silt loam; moderate, medium, granular structure; very friable; pH 6.5; clear, smooth boundary.

B21--17 to 22 inches, dark-brown (10YR 4/3) silt loam; moderate, medium, subangular blocky structure; friable; patchy clay films on vertical ped surfaces; pH 6.5; clear, smooth boundary.

B22--22 to 38 inches, brown (10YR 4/3) silt loam; weak, medium, subangular blocky structure; friable; pH 6.5; clear, smooth boundary.
B3--38 to 45 inches, brown (10YR 4/3) silt loam; weak, coarse, subangular blocky structure to massive (structureless); friable; pH 5.5; clear, smooth boundary.
C1--45 to 52 inches, brown (10YR 4/3) silt loam; massive; friable; pH 5.0; abrupt, smooth boundary.
C2--52 to 60 inches, brown (10YR 4/3) loamy very fine sand; single grain (structureless); loose; pH 6.0; abrupt, smooth boundary.
C3--60 to 72 inches, brown (10YR 4/3) silt loam; massive; very friable; pH 6.0.

The A horizon ranges from 10 to 20 inches in thickness. Very fine sand makes up as much as 50 percent of the soil mass in some places.

This soil is next to Adler, Tiptonville, and Reelfoot soils. Worthen silt loam has a darker colored surface layer, is better drained, and is more acid than Adler soils. It is better drained and has less clay in the subsoil than Tiptonville and Reelfoot soils.

Worthen silt loam has a slightly acid or neutral surface layer. Lime generally is not needed. The content of phosphorus and potassium is medium to high, but most crops respond well if fertilizer containing these elements is applied. Nonlegumes give excellent response to nitrogen.

Roots, water, and air readily penetrate this soil, which is easy to work and to keep in good tilth. Plants nearly always have a good supply of moisture because the available moisture holding capacity is high.

Practically all of the acreage is used for row crops, which can be grown year after year. Cotton, corn, and soybeans are the main crops. Some wheat and alfalfa are grown. Production is good if only those good practices commonly used in the county are applied.

None of this soil is wooded, but cherrybark oak, sweet pecan, and cottonwood would grow rapidly.

An abundance of food and cover for wildlife can be grown. (Capability unit I-1)

Some readers, particularly those who practice large-scale farming, may find it practical to use and manage alike some of the different kinds of soils on their farm. These readers can make good use of the capability classification system, a grouping that shows, in a general way, how suitable soils are for most kinds of farming.

In the capability system, all the kinds of soil are grouped at three levels: the class, the subclass, and the unit. Following is a descriptive outline of the system as it applies in Lake County. The placement of any mapping unit in the grouping can be learned by turning to the "Guide to Mapping Units" at the back of this survey, or by referring to the notation that ends the description of each mapping unit in the section that describes the soils of the county.

Class I. Soils that have few limitations that restrict their use. (No subclasses)
- Unit I-1.--Nearly level, well drained and moderately well drained, loamy and silty soils.
- Unit I-2.--Nearly level, somewhat poorly drained, silty and loamy soils.

Class II. Soils that have some limitations that reduce the choice of plants or that require moderate conservation practices.
- Subclass IIw.--Soils that have moderate limitations because of excess water.
  - Unit IIw-1.--Nearly level, well drained and moderately well drained, loamy and silty soils that are frequently flooded.
  - Unit IIw-2.--Nearly level, somewhat poorly drained soils that have a clayey surface layer and a loamy or silty subsoil.
  - Unit IIw-3.--Nearly level, somewhat poorly drained, loamy and silty soils that are frequently flooded.
  - Unit IIw-4.--Nearly level, poorly drained soils that have a dark-colored, loamy surface layer and a gray, clayey subsoil.

Class III. Soils that have severe limitations that reduce the choice of plants, require special conservation practices, or both.
- Subclass IIIw.--Soils that have severe limitations because of excess water.
  - Unit IIIw-1.--Nearly level, somewhat poorly drained soils that have a clayey surface layer and a loamy or silty substratum; frequently flooded.
  - Unit IIIw-2.--Nearly level to slightly concave, poorly drained, clayey soils.
- Subclass IIIs.--Soils that have severe limitations of moisture capacity or tilth.
  - Unit IIIs-1.--Nearly level, excessively drained, loamy to sandy soils.

Class IV. Soils that have very severe limitations that restrict the choice of plants, require very careful management, or both.
- Subclass IVw.--Soils that have very severe limitations for cultivation because of excess water.
  - Unit IVw-1.--Nearly level, poorly drained, clayey soils that are frequently flooded.
- Subclass IVs.--Soils that have very severe limitations because of low available moisture holding capacity or other soil features.
  - Unit IVs-1.--Nearly level, excessively drained, sandy soils.

Class V. Soils that are not likely to erode but have other limitations, impractical to remove, that limit their use largely to pasture, range, woodland, or wildlife. (None of the soils in Lake County have been placed in class V.)

Class VI. Soils that have severe limitations that make them generally unsuitable for cultivation and that limit their use largely to pasture, woodland, or wildlife.
- Subclass VIe.--Soils severely limited, chiefly by risk of erosion, if protective cover is not maintained.
  - Unit VIe-1.--Long, steep-sided levees and adjacent borrow areas.

Class VII. Soils that have very severe limitations that make them unsuitable for cultivation without major reclamation and that restrict their use largely to pasture, woodland, or wildlife.
- Subclass VIIw.--Soils that have very severe limitations because of excess water.
  - Unit VIIw-1.--Very poorly drained soils and swamps; water on or near the surface nearly all the year.

Class VIII. Soils and landforms that have limitations that preclude their use for commercial plants and restrict their use to recreation, wildlife, or water supply, or to esthetic purposes. (None of the soils in Lake County have been placed in class VIII.)

As shown in the foregoing list, the broadest grouping, the capability class, is designated by Roman numerals I through VIII. In class I are the soils that have few limitations, the widest range of use, and the least risk of damage when they are used. The soils in the other classes have progressively greater natural limitations. In class VIII are soils and landforms so rough, so shallow, or otherwise so limited that they do not produce worthwhile yields of crops, forage, or wood products.

The subclasses indicate major kinds of limitations within the classes. Within most of the classes there can be up to four subclasses. The subclass is indicated by adding a small letter, <u>e</u>, <u>w</u>, <u>s</u>, or <u>c</u>, to the class numeral, for example, VI<u>e</u>. The letter <u>e</u> shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; <u>w</u> means that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by

artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, indicates that the chief limitation is climate that is too cold or too dry.

In class I there are no subclasses, because the soils of this class have few or no limitations. Class V can contain, at the most, only subclasses *w*, *s*, and *c*, because the soils are subject to little or no erosion but have other limitations that confine their use largely to pasture, range, woodland, or wildlife.

Within the subclasses are the capability units, which are groups of soils enough alike to be suited to the same crops and pasture plants, to require similar management, and to be similar in productivity and other responses to management. Capability units generally are designated by adding an Arabic numeral to the subclass symbol, for example, IIw-1 or IIIs-1.

Soils are classified in capability classes, subclasses, and units in accordance with the degree and kind of permanent limitation, but without considering major and generally expensive alterations that could be made in the slope, depth, or other characteristics of the soils, and without considering possible but unlikely major reclamation projects.

Table 3 lists, for each soil in the county judged suitable for crops, the predicted average yields per acre of the main crops under two levels of management. Yields produced under management that is common in Lake County are listed in columns A. Yields to be expected under high-level, or improved, management are listed in columns B. Several of the practices are used both under common and under improved management.

The figures in table 3 represent averages for the 10-year period that ended in 1965. They are based on data obtained through experiments and on information obtained from farmers and agricultural workers who have had experience with the crops and soils in Lake County.

The following general practices, applicable whatever crop is grown, are part of the system of management under which the yields in columns B can be expected: (1) Selection of crops and cropping systems suited to the soil; (2) application of fertilizer and lime in accordance with needs indicated by chemical tests and by past practices of cropping and fertilizing; (3) preparation of an adequate seedbed; (4) use of crop varieties that are suited to the area; (5) use of suitable methods of planting or seeding, use of proper rates of seeding, and planting of seed at the right time; (6) inoculation of legumes; (7) shallow cultivation of row crops; (8) control of weeds, insects, and diseases; (9) use of adequate surface drainage; and (10) selection of suitable harvesting methods.

The following specific practices of improved management are needed to produce the yields of corn, cotton, soybeans, wheat, and alfalfa listed in columns B of table 3:

Corn.--Practices are given for three different levels of estimated productivity.

Soils that yield 80 bushels or more per acre are excellent for corn. Yield predictions on such soils are based on (1) planting for a stand of about 16,000 plants per acre and (2) applying about 120 pounds of nitrogen per acre.

Soils that yield 60 to 80 bushels per acre are good for corn. Yield predictions on such soils are based on (1) planting for a stand of about 12,000 plants per acre and (2) applying 90 pounds of nitrogen per acre.

Soils that yield 40 to 60 bushels per acre are

TABLE 3.--PREDICTED AVERAGE ACRE YIELDS OF PRINCIPAL CROPS UNDER TWO LEVELS OF MANAGEMENT

[Yields in columns A are to be expected under common, or average, management; yields in columns B are to be expected under improved management. Absence of yield indicates crop is not suited to the soil or is not commonly grown on it]

Soil	Corn		Cotton		Soybeans		Wheat		Alfalfa	
	A	B	A	B	A	B	A	B	A	B
	Bu.	Bu.	Lb. of lint	Lb. of lint	Bu.	Bu.	Bu.	Bu.	Tons	Tons
Adler silt loam	65	100	675	800	35	40	35	45	2.5	3.6
Adler silt loam, frequently flooded	65	100	675	800	35	40	--	--	---	---
Bowdre silty clay	55	75	450	650	28	40	25	35	2.0	3.2
Bowdre silty clay, frequently flooded	55	75	450	650	28	40	--	--	---	---
Bruno soils and Alluvial land	25	35	350	400	18	25	25	35	---	---
Commerce silt loam	60	90	600	750	28	40	25	35	2.2	3.0
Commerce silt loam, frequently flooded	60	90	600	750	28	40	--	--	---	---
Crevasse loamy sand	---	---	---	---	--	--	18	27	---	---
Iberia silt loam	35	60	375	525	27	35	--	--	---	---
Iberia silty clay loam	35	55	375	500	27	35	--	--	---	---
Levees and Borrow Pits	---	---	---	---	--	--	--	--	---	---
Mhoon clay	---	---	---	---	--	--	--	--	---	---
Reelfoot-Bruno Complex	35	50	350	500	20	30	20	30	---	---
Reelfoot silt loam	55	80	400	675	28	35	25	37	2.1	2.8
Reelfoot silty clay loam	50	70	350	600	25	30	20	33	2.1	2.8
Robinsonville fine sandy loam, frequently flooded	60	90	550	750	25	35	--	--	---	---
Sharkey clay	30	50	375	450	25	32	--	--	---	---
Swamp	---	---	---	---	--	--	--	--	---	---
Tiptonville silt loam	60	90	500	725	30	40	30	45	2.0	3.0
Tunica clay	30	50	375	475	25	30	20	30	---	---
Tunica clay, frequently flooded	30	50	375	450	25	30	--	--	---	---
Worthen silt loam	60	100	550	800	25	35	35	45	2.7	3.6

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fair for corn. Yield predictions on such soils are based on (1) planting for a stand of about 8,000 plants per acre and (2) applying about 60 pounds of nitrogen per acre.

Soils that yield less than 40 bushels per acre under good management are poor for corn and can be used more profitably for other crops.

Cotton.--Practices on which predictions of yields are based are (1) spacing rows about 38 to 40 inches apart; (2) thinning to obtain a stand of between 20,000 and 60,000 plants per acre, without skips; and (3) applying about 70 pounds of nitrogen per acre.

Soils that yield less than about 1 bale per acre under good management are poor soils for cotton and can be used more profitably for other crops.

Soybeans.--No specific management practices are assumed.

Wheat.--Practices on which predictions of yields are based are applying nitrogen at the rate of 20 to 30 pounds per acre at seeding time in fall and at the rate of 30 pounds per acre as a topdressing in spring.

Alfalfa.--Practices on which predictions of yields are based are (1) applying up to 15 pounds of nitrogen and 20 pounds of borax at seeding time, 20 pounds of borax annually after the first year, and phosphate and potash in amounts determined by soil tests and (2) controlling grazing, and cutting hay at the proper time and to the right stubble height. No hay is cut from about September 10 to the date of the first killing frost.

ENGINEERING USES OF THE SOILS[3]

Soils engineering deals with soils as structural material and as foundation material upon which structures rest. Some soil properties are of special interest to engineers because they affect the construction and maintenance of roads, airports, pipelines, building foundations, water storage facilities, erosion control structures, drainage systems, and sewage disposal systems.

The information in this section can be used to--

1. Make soil and land-use studies that will aid in selecting and developing industrial, business, residential, and recreational sites.
2. Make preliminary estimates of engineering properties of soils for use in the planning of agricultural drainage systems, irrigation systems, and farm ponds.
3. Make preliminary evaluations of soil and ground conditions that will aid in selecting locations for highways and airports, and in planning detailed investigations of the selected locations.
4. Locate probable sources of sand and other construction materials.
5. Correlate performance of engineering structures with soil mapping units and thus develop information that will be useful in designing and maintaining engineering structures.
6. Determine the suitability of soils for cross-country movement of vehicles and construction equipment.
7. Supplement information obtained from other published maps, reports, and aerial photographs, for the purpose of making maps and reports that can be used readily by engineers.

Tables 4 and 5 provide data and interpretations useful in soils engineering. With the use of the soil map for identification, the information in these tables can be useful for many purposes. It should be emphasized that it does not eliminate the need for sampling and testing at the site of specific engineering works involving heavy loads and excavations deeper than the depths of layers here reported. Even in these situations, however, the tables and the soil map are useful in planning more detailed field investigations and suggesting the kinds of problems that can be expected.

Some of the special terms used by soil scientists may not be familiar to engineers, and some common terms may have special meanings in soil science. These terms are defined in the Glossary. Additional information about the soils can be found in other sections of this survey, particularly the section "Descriptions of the Soils."

Engineering Classification Systems

Most highway engineers classify soils in accordance with the system approved by the American Association of State Highway Officials (AASHO) (1). In this system soil materials are classified in seven principal groups. The groups range from A-1, which consists of gravelly soils of high bearing capacity, to A-7, which consists of clay soils of low strength when wet. Within each group the relative engineering value of the soil material is indicated by a group index number. Group indexes range from 0 for the best material to 20 for the poorest. They can be determined only by laboratory tests. None are shown in this survey, because laboratory data are not available for the soils in Lake County.

Some engineers prefer to use the Unified soil classification system (8). In this system soil materials are identified as coarse grained (eight classes), fine grained (six classes), or highly organic (one class).

Both the AASHO and Unified systems classify soil material according to particle-size gradation and plasticity characteristics. The classifications permit the engineer to make a rapid appraisal of a soil by comparing it with more familiar soils that have the same classification.

Engineering Properties of the Soils

Table 4 gives estimates of some of the soil characteristics significant in engineering and of the engineering classification of the soil material in the principal horizons.

Permeability, as used in table 4, relates only to the movement of water downward through uncompacted soil material. It does not include lateral seepage. The estimates are based on structure and porosity of the soil. Plowpans, surface crusts, and other properties resulting from use of the soils are not considered.

Available water capacity is that amount of capillary water in a soil available for plant growth after all free water has drained away.

Reaction is the degree of acidity or alkalinity of a soil, expressed as a pH value. The pH value and relative terms used to describe soil reaction are explained in the Glossary.

Shrink-swell potential is an indication of the volume change to be expected of the soil material with changes in moisture content. Shrinking and swelling of soils cause much damage to building foundations, roads, and other structures.

Features Affecting Engineering Work

Table 5 lists, for each soil in the county, suitability ratings for specific purposes and soil features that affect highway construction or

[3] DAVID L. ROYSTER, chief soils engineer, Materials and Test Division, Tennessee Department of Highways, assisted in writing this section.

TABLE 4.--ESTIMATED

[Soils of this county formed in thick alluvium; bedrock is at such great

Series and map symbols	Depth to seasonal water table	Depth from surface (typical profile)	Classification
			Dominant USDA texture
	Feet	Inches	
Adler: Ad, Af	2	0-40	Silt loam
		40-72	Stratified silt loam and loam
Bowdre: Bo, Bs	$1\frac{1}{2}$	0-18	Silty clay
		18-72	Silt loam, loam, and silty clay loam
Bruno: Bu	$3\frac{1}{2}$	0-12	Sandy loam
Alluvial land part too variable to rate.		12-45	Loamy sand or sand
		45-72	Variable; ranges from sand to clay.
Commerce: Cm, Co	1	0-23	Silt loam and loam
		23-72	Silt loam or silty clay loam
Crevasse: Cr	5+	0-60	Loamy sand or sand
Iberia: Ib, Ie	0	0-14	Silt loam or silty clay loam
		14-72	Clay
Levees and Borrow Pits: Lb. Properties variable; onsite studies needed.			
Mhoon: Mh	0	0-12	Clay
		12-54	Silt loam and silty clay loam
Reelfoot: Rb, Re, Rf	2	0-14	Silt loam or silty clay loam
For properties of Bruno part of Rb, see Bruno series.		14-38	Silty clay loam or silt loam
		38-72	Silt loam or loam
Robinsonville: Rm	3	0-72	Strata of fine sandy loam, loam, and silt loam.
Sharkey: Sa	0	0-72	Clay
Swamp: Sw. Properties variable; onsite studies needed.			
Tiptonville: Ta	3	0-12	Silt loam
		12-45	Silty clay loam and silt loam
		45-72	Silt loam
Tunica: Tc, Tu	0	0-24	Clay
		24-72	Silt loam, loam, and very fine sandy loam.
Worthen: Wo	6+	0-17	Silt loam
		17-52	Silt loam
		52-72	Silt loam or fine sandy loam

PROPERTIES OF THE SOILS

depth that it generally does not influence use and management of the soils]

Classification--con.		Percentage passing sieve--		Permeability	Available water capacity	Reaction	Shrink-swell potential
Unified	AASHO	No. 10 (2.0 mm.)	No. 200 (0.074 mm.)				
				Inches per hour	Inches per inch of soil	pH	
ML	A-4	100	90-100	0.63-2.0	0.25	6.6-7.8	Low.
ML or ML-CL	A-4	100	70-100	0.63-2.0	.23	6.6-7.8	Low.
MH or CH	A-7	100	95-100	<0.20	.18	6.6-7.8	Moderate.
ML or ML-CL	A-4 or A-6	100	75-100	0.63-2.0	.20	6.6-7.8	Low.
SM or ML	A-4	100	40-60	>6.3	.13	6.6-7.3	Low.
SM	A-2	100	10-30	>6.3	.09	6.6-7.3	Low.
ML or ML-CL	A-4	100	75-100	0.63-2.0	.22	6.6-7.8	Low.
ML, CL, or ML-CL	A-4 or A-6	100	90-100	0.63-2.0	.20	6.6-7.8	Low.
SM	A-3 or A-2	100	5-25	>6.3	.05	6.6-7.3	Low.
ML or ML-CL	A-4 or A-6	100	90-100	0.20-2.0	.20	6.1-7.3	Moderate.
CH or MH-CH	A-7	---	100	<0.20	.17	6.1-7.8	High.
MH	A-7	100	95-100	<0.20	.17	6.6-7.8	High.
ML, CL, or ML-CL	A-4 or A-6	100	60-95	0.63-2.0	.20	6.6-7.8	Low.
ML or ML-CL	A-4	100	90-100	0.63-2.0	.22	6.1-7.3	Low.
ML, CL, or ML-CL	A-4 or A-6	100	95-100	0.63-2.0	.20	5.5-7.3	Low.
ML, CL, or ML-CL	A-4	100	60-95	0.63-2.0	.20	5.5-7.3	Low.
ML or ML-CL	A-4	100	65-95	0.63-2.0	.20	6.6-7.8	Low.
CH or MH-CH	A-7	---	100	<0.20	.16	6.1-7.8	High.
ML	A-4	100	90-100	0.63-2.0	.22	6.1-7.3	Low.
ML or ML-CL	A-6	100	90-100	0.63-2.0	.22	5.6-7.3	Low.
ML or ML-CL	A-4	100	60-95	0.63-2.0	.20	5.6-7.3	Low.
CH or MH-CH	A-7	---	100	<0.02	.17	6.1-7.8	High.
ML, CL, or ML-CL	A-4 or A-6	100	60-100	0.20-2.0	.20	6.1-7.8	Low.
ML or ML-CL	A-4	100	75-95	0.63-2.0	.25	6.1-7.3	Low.
ML or ML-CL	A-4	100	90-100	0.63-2.0	.22	5.6-6.5	Low.
ML or ML-CL	A-4	100	60-100	0.63-2.0	.20	5.6-7.3	Low.

Series and map symbols	Suitability as source of--			Soil features affecting--
	Topsoil	Sand	Road fill	Highway location
Adler: Ad, Af---------	Good-----	Unsuitable----------	Poor: compacts adequately only at optimum moisture content; highly erodible on steep slopes.	Flooding in some areas---
Bowdre: Bo, Bs--------	Poor-----	Unsuitable----------	Poor to depth of 10 to 20 inches; good below depth of 20 inches.	Highly plastic consistence in topmost 10 to 20 inches; flooding in some areas.
Bruno: Bu-------------	Poor: too sandy.	Good to poor: sand is medium or fine; poorly graded.	Good----------------------	Good subgrade material; flooding in some areas; poor trafficability when dry.
Commerce: Cm, Co------	Good-----	Unsuitable----------	Good----------------------	Flooding; seasonal high water table.
Crevasse: Cr----------	Poor: too sandy.	Good to poor: sand is medium or fine and poorly graded.	Good as subgrade material: good compaction.	Good as subgrade material; flooding in some places; poor trafficability when dry.
Iberia: Ib, Ie--------	Poor-----	Unsuitable----------	Poor----------------------	Highly plastic consistence in subsoil; seasonal flooding; high water table.
Levees and Borrow Pits: Lb. Properties variable; onsite studies needed.				
Mhoon: Mh-------------	Poor-----	Unsuitable----------	Poor to depth of 1 foot; fair below.	Highly plastic consistence in topmost foot; high water table; flooding.
Reelfoot: Rb, Re, Rf-- For interpretations of Bruno part of Rb, see Bruno series.	Good-----	Unsuitable----------	Good----------------------	Seasonal high water table.
Robinsonville: Rm-----	Good-----	Poor----------------	Poor: compacts adequately only at optimum moisture content; highly erodible on steep slopes.	Annual flooding---------
Sharkey: Sa-----------	Poor-----	Unsuitable----------	Poor----------------------	Highly plastic consistence; flooding; high water table.
Swamp: Sw. Properties variable; onsite studies needed.				

Soil features affecting--cont.				Degree and kinds of limitations for use as septic tank filter fields
Dikes or levees	Reservoirs	Agricultural drainage	Irrigation	
Compacts adequately only at optimum moisture content; highly erodible on steep slopes.	Permeable subsoil material.	Not needed------------	All features favorable.	Severe in flooded areas, moderate in others: wetness in subsoil.
Highly plastic consistence in surface layer; good soil material below depth of 20 inches.	Permeable strata below depth of 20 inches in places.	Slowly permeable surface layer; good to poor stability on ditchbanks.	Slow water intake.	Severe: clayey surface layer; wetness in subsoil; flooding.
Rapid permeability to depth of $3\frac{1}{2}$ feet or more.	Rapid permeability to depth of $3\frac{1}{2}$ feet or more.	Not needed------------	Rapid water intake; frequent applications needed.	Severe: rapid permeability; flooding in some areas.
Flooding; seasonal high water table; good to fair compaction.	Permeable material to depth of 2 feet or more.	Good stability on ditchbanks.	All features favorable.	Severe: flooding; seasonal wetness in subsoil.
Rapid permeability to depth of $3\frac{1}{2}$ feet or more; poor compaction; highly erodible on slopes.	Rapid permeability to depth of $3\frac{1}{2}$ feet or more.	Not needed------------	Rapid water intake; frequent applications needed.	Severe: rapid permeability to depth of $3\frac{1}{2}$ feet or more; flooding in some areas.
High shrink-swell potential below depth of 1 foot; cracks when dry.	All features favorable.	Slow permeability; tile inoperable; good stability on ditchbanks.	Slow water intake.	Severe: slow permeability; flooding; high water table.
Highly plastic consistence in topmost foot; good material below depth of 1 foot; high water table.	Permeable material below depth of 1 foot; high water table.	Slow permeability in surface layer; poor stability on ditchbanks; no outlets.	High water table.	Severe: flooding; high water table.
All features favorable-----	All features favorable.	Good stability on ditchbanks.	All features favorable.	Severe: seasonal high water table.
Compacts adequately only at optimum moisture content; highly erodible on steep slopes.	Permeable material.	Not needed------------	All features favorable.	Severe: flooding.
High shrink-swell potential; cracks when dry.	All features favorable.	Slow permeability; tile inoperable; good stability on ditchbanks.	Slow water intake.	Severe: slow permeability; flooding; high water table.

TABLE 5.--INTERPRETATIONS OF

Series and map symbols	Suitability as source of--			Soil features affecting--
	Topsoil	Sand	Road fill	Highway location
Tiptonville: Ta-------	Good-----	Unsuitable----------	Good---------------------	All features favorable---
Tunica: Tc, Tu--------	Poor-----	Unsuitable----------	Poor to depth of 20 to 40 inches; good below depth of 40 inches.	Highly plastic consistence in surface layer.
Worthen: Wo-----------	Good-----	Unsuitable----------	Good---------------------	All features favorable---

Soil features affecting--con.				Degree and kinds of limitations for use as septic tank filter fields
Dikes or levees	Reservoirs	Agricultural drainage	Irrigation	
All features favorable------	Permeable strata below depth of 6 feet.	Not needed------------	All features favorable.	Slight.
High shrink-swell potential to depth of 20 to 40 inches.	Permeable material below depth of 20 to 40 inches.	Slowly permeable surface layer; tile inoperable.	Slow water intake.	Severe: slow permeability; high water table; flooding.
All features favorable------	Permeable strata below depth of 6 feet.	Not needed------------	All features favorable.	Slight.

agricultural engineering. The features generally are not apparent to an engineer unless he has seen the results of a field investigation. They are, however, significant enough to influence construction practices.

The ratings of the soils as sources of topsoil relate to the uppermost 12 inches of the soil profile, because normally only the surface layer is removed for use as topsoil. Many of the soils in Lake County are suitable sources. Only those that have a high clay content or a high sand content are rated poor or unsuitable.

Only Crevasse and Bruno soils are suitable sources of sand. Sandbars in the Mississippi River provide an abundance of poorly graded sand. None of the soils are suitable as a source of gravel. All gravel deposits in this county are buried with several hundred feet of sediment.

Material suitable for road fill is scarce in this county because the soils generally are either too plastic and sticky or too silty. The suitability of a soil material for road fill depends mainly on the texture and natural water content. The most suitable fill material is in the subsoil of Worthen, Tiptonville, and Reelfoot soils, all of which have good compaction characteristics. Crevasse and Bruno soils, which are sandy, are good sources of road fill. Highly erodible soils, those composed primarily of fine sand and silt, are poor as a source of fill. If such soils are used, the slope must be gentle and quickly covered with vegetation. Otherwise, a network of gullies is formed. A silty soil requires close control of moisture during compaction.

Among the features unfavorable for highway locations are instability, a high water table, and flooding. Many soils in Lake County are subject to flooding or have a high water table. A highway on these soils must be on an embankment high enough to keep the roadway above water (pl. VI).

This county has only a few farm ponds because little of the acreage is in pasture. Most of the soils are suitable as reservoir sites. Exceptions are Crevasse soils, Bruno soils, and Adler silt loam, frequently flooded. Some of the soils suitable for reservoirs contain layers of sand, but these can either be removed from the site or be mixed with clayey material and compacted.

Many of the soils in Lake County need to have surface water removed and the water table lowered. Drainage ditches generally remove excess water satisfactorily, but drainage of low spots near Reelfoot Lake is not economically feasible. Also, low spots along the levee are difficult to drain because excess water has to be pumped over the levee. Drainage ditches are dug through some tracts that do not need drainage in order to remove excess water from the adjacent soils. Drainage ditches seldom provide adequate surface drainage unless some land smoothing or grading is done to eliminate low spots that hold water (pl. VI). Tile drains are not commonly used in the county, because they do not operate satisfactorily in many of the soils.

Soils differ from one another because of differences in the environments in which they formed. By studying the characteristics of an existing soil, one can reconstruct the process of its formation and can assemble data that provide a basis for predicting how the soil will react to particular uses and for its placement in the nationwide scheme of soil classification.

Formation of the Soils

The nature of the soil at any given point is determined by the combined influence of the five factors of soil formation: parent material, climate, living organisms, relief, and time. All five of these factors affect the formation of every soil. In some places one is more important; in other places, another; and in some places the influence of each is about equal.

Differences in parent material, relief, and time are the major causes of differences among the soils in Lake County. Climate has made a strong impression, but it is uniform throughout the county and so does not account for major differences. Living organisms, mainly trees, also have influenced soil development but have not caused significant differences.

Alluvium was the parent material of the soils in Lake County. It was washed from soils that developed from many kinds of weathered rock, from glacial drift, from loess, and from marine deposits. The alluvium contains a number of different minerals, some of which are only partly weathered.

The soils differ widely in texture because of the way the alluvium was deposited by the Mississippi River. Crevasse, Bruno, and Robinsonville soils formed in sandy and loamy sediment dropped nearest the river as the water overflowed the riverbanks. These soils are on the natural levees. Adler soils, which are on the natural levees but at a little distance from the river, formed in silty sediment. Still on the levees but farther from the river are Commerce soils, which formed in medium-textured sediment consisting of silt mixed with a small amount of clay and some very fine sand. These sediments were dropped as floodwater flowed away from the river and moved more slowly. Sharkey, Iberia, Tunica, and Bowdre soils formed in slack-water deposits consisting of clay and fine silt. These deposits settled out of muddy, still water trapped in depressions and old river channels after floodwater drained away.

This simple pattern of coarse-textured sediment next to the river, clayey deposits at a distance, and medium-textured sediment in between, no longer exists in Lake County. Shifting back and forth across its flood plain, the meandering river has cut away segments of natural levees, has deposited moderately coarse textured and medium-textured sediment over the clayey, slack-water deposits, and thus has mixed the different textures.

Relief, or lay of the land, is one of the major causes of differences among the soils in Lake County. It affects the soil directly by determining the drainage and indirectly by determining the kind of vegetation that grows in a particular area.

The well drained and moderately well drained Worthen, Tiptonville, Robinsonville, and Adler soils formed on ridges and other high places where excess water drains away readily. Also in the higher areas are Bruno and Crevasse soils, but the position of these soils is not so important, because they are excessively drained, sandy soils. In intermediate positions are Bowdre, Commerce, and Reelfoot soils, which are somewhat poorly drained, and Tunica soils, which are poorly drained. Iberia, Sharkey, and Mhoon soils, which are in low areas, are poorly drained.

Time also is one of the major causes of differences in the soils of this county. Reelfoot, Tiptonville, and Worthen soils formed on ridges in material deposited many years ago. A fairly large amount of organic matter has accumulated in the surface layer of these soils and has imparted to it a dark color. Carbonates have been leached from the subsoil, and some clay minerals have moved downward and have accumulated in the upper part of the subsoil. The rest of the soils in the county have been in place too short a time for the parent material to be changed much. Robinsonville and Adler soils formed in recently deposited sediment that has been changed only slightly. Commerce, Bowdre, and Tunica soils also formed in recent sediment that shows little change except mottling. Excess water has made Mhoon, Sharkey, and Iberia soils gray to nearly black and mottled with several colors, but otherwise the parent material has not been altered. Crevasse and Bruno soils formed in recently deposited sandy sediments that change slowly and so have been altered little.

Classification of the Soils

Soils are classified so that we can more easily remember their significant characteristics, assemble knowledge about them, see their relationship to one another and to the whole environment, and understand their behavior and their response to management. First through classification, and then through use of soil maps, we can apply our knowledge of soils to specific tracts of land.

Two systems of classifying soils have been used in the United States in recent years. The older system was adopted in 1938 (2) and revised later (5). The system currently used was adopted by the National Cooperative Soil Survey, effective March 1967. This system is under continual study. Readers interested in the development of the system should refer to the latest literature available (3, 7).

The current system of classification defines classes in terms of observable or measurable properties of soils. It has six categories. Beginning with the most inclusive, these categories are the order, the suborder, the great group, the subgroup, the family, and the series. The placement of some

soil series in the current system, particularly in families, may change as more precise information becomes available. In table 6 the soils of Lake County are classified according to the family, subgroup, and order of the current system and according to the great soil group of the 1938 system. Following are brief descriptions of the six categories in the current system.

ORDER: Ten soil orders are recognized in the current system: Entisols, Vertisols, Inceptisols, Aridisols, Mollisols, Spodosols, Alfisols, Ultisols, Oxisols, and Histosols. The orders are primarily broad climatic groupings. Two exceptions are the Entisols and Histosols, which include soils of many different climates. Three of the orders are represented in this county--Entisols, Inceptisols, and Mollisols.

Entisols are recent soils in which there has been little or no horizon development. Inceptisols occur most commonly on young but not recent land surfaces. Mollisols have a dark-colored, thin surface layer and high base saturation.

SUBORDER: Each order is divided into suborders, primarily on the basis of those soil characteristics that seem to produce classes having the greatest genetic similarity. The suborders have a narrower climatic range than the orders. The soil properties used to define suborders reflect mainly either the presence or absence of waterlogging or differences resulting from the climate or vegetation.

GREAT GROUP: Each suborder is divided into great groups, which are based on uniformity in kind and sequence of the major soil horizons and features. The horizons considered in making these separations are those in which clay, iron, or humus has accumulated and those that have a pan that interferes with the growth of roots or the movement of water. The features considered are the self-mulching properties of clay, soil temperature, major differences in chemical composition (mainly in calcium, magnesium, sodium, and potassium), and the like.

SUBGROUP: Each great group is divided into subgroups, one representing the central (typic) segment of the group and others, called intergrades, that have properties of one great group and also one or more properties of another great group, suborder, or order. Subgroups may also be recognized in those instances where soil properties intergrade outside the range of any established great group, suborder, or order.

FAMILY: Families are established within a subgroup primarily on the basis of properties important to the growth of plants or the behavior of soils when they are used for engineering. Among the properties considered are texture, mineral composition, reaction, soil temperature, permeability, thickness of horizons, and consistence.

SERIES: The series has the narrowest range of characteristics of the categories in the classification system. It is described fully in the section "How This Survey Was Made." The profiles described under the mapping units in the section "Descriptions of the Soils" are considered representatives of the soil series recognized in this survey.

TABLE 6.--CLASSIFICATION OF SOILS

Series	Current system			1938 system
	Family	Subgroup	Order	Great soil group
Adler----------	Coarse-silty, mixed, nonacid, thermic.	Aquic Udifluvents-----------	Entisols-----	Alluvial soils.
Bowdre---------	Clayey over loamy, mixed, thermic.	Aquic Fluventic Hapludolls---	Mollisols----	Alluvial soils.
Bruno----------	Sandy, mixed, thermic---------	Typic Udifluvents-----------	Entisols-----	Alluvial soils.
Commerce-------	Fine-silty, mixed, nonacid, thermic.	Aeric Fluventic Haplaquepts--	Inceptisols--	Alluvial soils.
Crevasse-------	Mixed, thermic----------------	Typic Udipsamments----------	Entisols-----	Regosols.
Iberia---------	Fine, montmorillonitic, noncalcareous, thermic.	Vertic Haplaquolls----------	Mollisols----	Humic Gley soils.
Mhoon----------	Fine-silty, mixed, nonacid, thermic.	Fluventic Haplaquepts--------	Inceptisols--	Low-Humic Gley soils.
Reelfoot-------	Fine-silty, mixed, thermic-----	Aquic Argiudolls------------	Mollisols----	Brunizems.
Robinsonville--	Coarse-loamy, mixed, nonacid, thermic.	Typic Udifluvents-----------	Entisols-----	Alluvial soils.
Sharkey--------	Very fine, montmorillonitic, nonacid, thermic.	Vertic Haplaquepts----------	Inceptisols--	Grumusols.
Tiptonville----	Fine-silty, mixed, thermic-----	Typic Argiudolls------------	Mollisols----	Brunizems.
Tunica---------	Clayey over loamy, montmorillonitic, nonacid, thermic.	Vertic Haplaquepts----------	Inceptisols--	Grumusols.
Worthen--------	Fine-silty, mixed, mesic-------	Cumulic Hapludolls----------	Mollisols----	Brunizems.

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GLOSSARY

Acidity. See Reaction, soil.

Aggregate, soil. Many fine particles held in a single mass or cluster, such as a clod, crumb, block, or prism.

Alluvium. Soil material, such as sand, silt, or clay, that has been deposited on land by streams.

Available moisture holding capacity. The capacity of a soil to hold water in a form available to plants. Amount of moisture held in soil between field capacity, or about one-third atmosphere of tension, and the wilting coefficient, or about 15 atmospheres of tension.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are--

Loose.--Noncoherent; will not hold together in a mass.

Friable.--When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.--When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.--When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.--When wet, adheres to other material, and tends to stretch somewhat and pull apart, rather than to pull free from other material.

Hard.--When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.--When dry, breaks into powder or individual grains under very slight pressure.

Cemented.--Hard and brittle; little affected by moistening.

Fertility, soil. The quality of a soil that enables it to provide compounds, in adequate amounts and in proper balance, for the growth of specified plants when other growth factors, such as light, moisture, temperature, and the physical condition (or tilth) of the soil, are favorable.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flood plain. Nearly level land, consisting of stream sediments, that borders a stream and is subject to flooding unless protected artificially.

Horizon, soil. A layer of soil, approximately parallel to the surface, that has distinct characteristics produced by soil-forming processes.

O horizon. The layer of organic matter on the surface of a mineral soil. This layer consists of decaying plant residues.

A horizon. The mineral horizon at the surface or just below an O horizon. This horizon is the one in which living organisms are most active, and it is therefore marked by the accumulation of humus. The horizon may have lost one or more of soluble salts, clay, and sesquioxides (iron and aluminum oxides).

B horizon. The mineral horizon below an A horizon. The B horizon is in part a layer of change from the overlying A to the

underlying C horizon. The B horizon also has distinctive characteristics caused (1) by accumulation of clay, sesquioxides, humus, or some combination of these; (2) by prismatic or blocky structure; (3) by redder or stronger colors than the A horizon; or (4) by some combination of these. The combined A and B horizons are usually called the solum, or true soil. If a soil lacks a B horizon, the A horizon alone is the solum.

C horizon. The weathered rock material immediately beneath the solum. This layer, commonly called the soil parent material, is presumed to be like that from which the overlying horizons were formed in most soils. If the underlying material is known to be different from that in the solum, a Roman numeral precedes the letter C.

R layer. Consolidated rock beneath the soil. The rock usually underlies a C horizon but may be immediately beneath an A or B horizon.

Loess. A fine-grained, wind-transported deposit consisting dominantly of silt-sized particles.

Mottled. Irregularly marked with spots of different colors that vary in number and size. Mottling in soils usually indicates poor aeration and lack of drainage. Descriptive terms are as follows: Abundance--few, common, and many; size--fine, medium, and coarse; and contrast--faint, distinct, and prominent. The size measurements are these: fine, less than 5 millimeters (about 0.2 inch) in diameter along the greatest dimension; medium, ranging from 5 millimeters to 15 millimeters (about 0.2 to 0.6 inch) in diameter along the greatest dimension; and coarse, more than 15 millimeters (about 0.6 inch) in diameter along the greatest dimension.

Munsell notation. A system for designating color by degrees of the three simple variables--hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with a hue of 10YR, a value of 6, and a chroma of 4.

Permeability. The quality of a soil horizon that enables water or air to move through it. Terms used to describe permeability are as follows: very slow, slow, moderately slow, moderate, moderately rapid, rapid, and very rapid.

Phase, soil. A subdivision of a soil type, series, or other unit in the soil classification system, made because of differences that affect the management of soils but not their classification. A soil type, for example, may be divided into phases because of differences in slope, stoniness, thickness, or some other characteristic that affects management.

Profile, soil. A vertical section of the soil through all its horizons and extending into the parent material.

Reaction, soil. The degree of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is precisely neutral in reaction because it is neither acid nor alkaline. An acid, or "sour," soil is one that gives an acid reaction; an alkaline soil is one that is alkaline in reaction. In words, the degrees of acidity or alkalinity are expressed thus:

	pH
Extremely acid	Below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Relief. The elevations or inequalities of a land surface, considered collectively.

Sand. As a soil separate, individual rock or mineral fragments ranging from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz, but sand may be of any mineral composition. As a textural class, soil that is 85 percent or more sand and not more than 10 percent clay.

Second bottom. The first terrace above the normal flood plain of a stream.

Series. A group of soils developed from a particular type of parent material and having genetic horizons that, except for texture of the surface layer, are similar in differentiating characteristics and in arrangement in the profile.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Slope. The incline of the surface of a soil. It is usually expressed in percentage of slope, which equals the number of feet of rise per 100 feet of horizontal distance.

Solum. The upper part of a soil profile, above the parent material, in which the processes of soil formation are active. The solum in a mature soil includes the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and other plant and animal life characteristic of the soil are largely confined to the solum.

Structure, soil. The arrangement of primary soil particles into compound particles or clusters that are separated from adjoining aggregates and have properties unlike those of an equal mass of unaggregated primary soil particles. The principal forms of soil structure are--platy (laminated), prismatic (vertical axis of aggregates longer than horizontal), columnar (prisms with rounded tops), blocky

(angular or subangular), and granular. Structureless soils are (1) single grain (each grain by itself, as in dune sand) or (2) massive (the particles adhering together without any regular cleavage, as in many claypans and hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the profile below plow depth.

Substratum. Any layer beneath the solum, or true soil.

Surface soil. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, about 5 to 8 inches in thickness. The plowed layer.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay, and clay. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Tilth, soil. The condition of the soil in relation to the growth of plants, especially soil structure. Good tilth refers to the friable state and is associated with high noncapillary porosity and stable, granular structure. A soil in poor tilth is nonfriable, hard, nonaggregated, and difficult to till.

Topsoil. A presumed fertile soil or soil material, ordinarily rich in organic matter, used to topdress roadbanks, lawns, and gardens.

Type, soil. A subdivision of the soil series, made on the basis of differences in the texture of the surface layer.

Waterlogged. State of being saturated with water.

GUIDE TO MAPPING UNITS

The suitability of the soils for use as cropland, woodland, and wildlife habitat is discussed in the soil descriptions. The capability classification system is discussed on pages 23 to 24. Additional information is given in tables as follows:

Acreage and extent, table 2, page 9.
Predicted yields, table 3, page 25.
Engineering uses of the soils, tables 4 and 5, pages 28 through 33.

Map symbol	Mapping unit	Described on page	Capability unit Symbol
Ad	Adler silt loam	9	I-1
Af	Adler silt loam, frequently flooded	10	IIw-1
Bo	Bowdre silty clay	10	IIw-2
Bs	Bowdre silty clay, frequently flooded	11	IIIw-1
Bu	Bruno soils and Alluvial land	11	IIIs-1
Cm	Commerce silt loam	12	I-2
Co	Commerce silt loam, frequently flooded	13	IIw-3
Cr	Crevasse loamy sand	13	IVs-1
Ib	Iberia silt loam	14	IIw-4
Ie	Iberia silty clay loam	14	IIw-4
Lb	Levees and Borrow Pits	15	VIe-1
Mh	Mhoon clay	15	VIIw-1
Rb	Reelfoot-Bruno Complex	17	IIIs-1
Re	Reelfoot silt loam	16	I-2
Rf	Reelfoot silty clay loam	17	IIw-2
Rm	Robinsonville fine sandy loam, frequently flooded	18	IIw-1
Sa	Sharkey clay	18	IIIw-2
Sw	Swamp	19	VIIw-1
Ta	Tiptonville silt loam	19	I-1
Tc	Tunica clay	20	IIIw-2
Tu	Tunica clay, frequently flooded	21	IVw-1
Wo	Worthen silt loam	21	I-1

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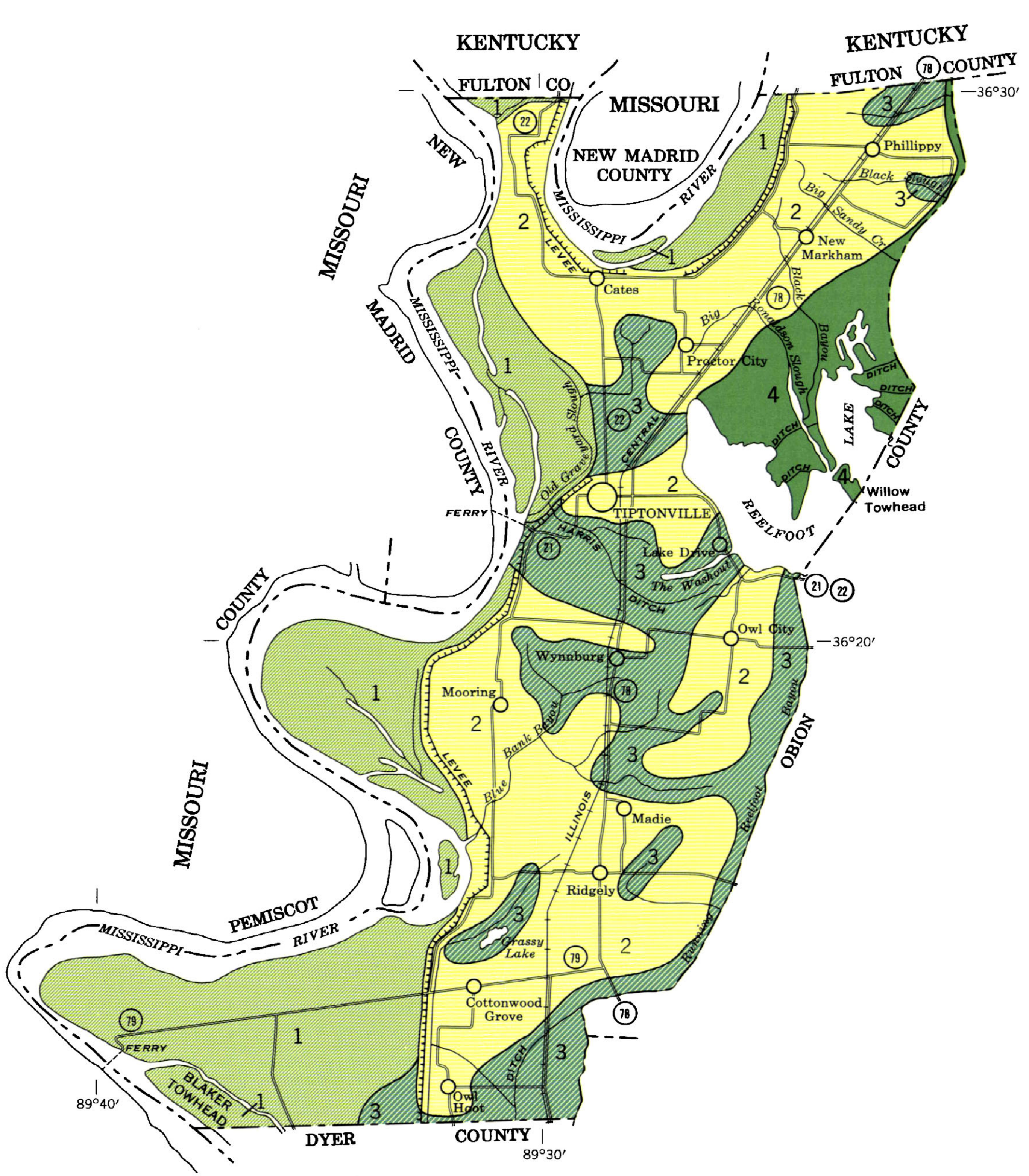
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
TENNESSEE AGRICULTURAL EXPERIMENT STATION

GENERAL SOIL MAP
LAKE COUNTY, TENNESSEE

SCALE IN MILES

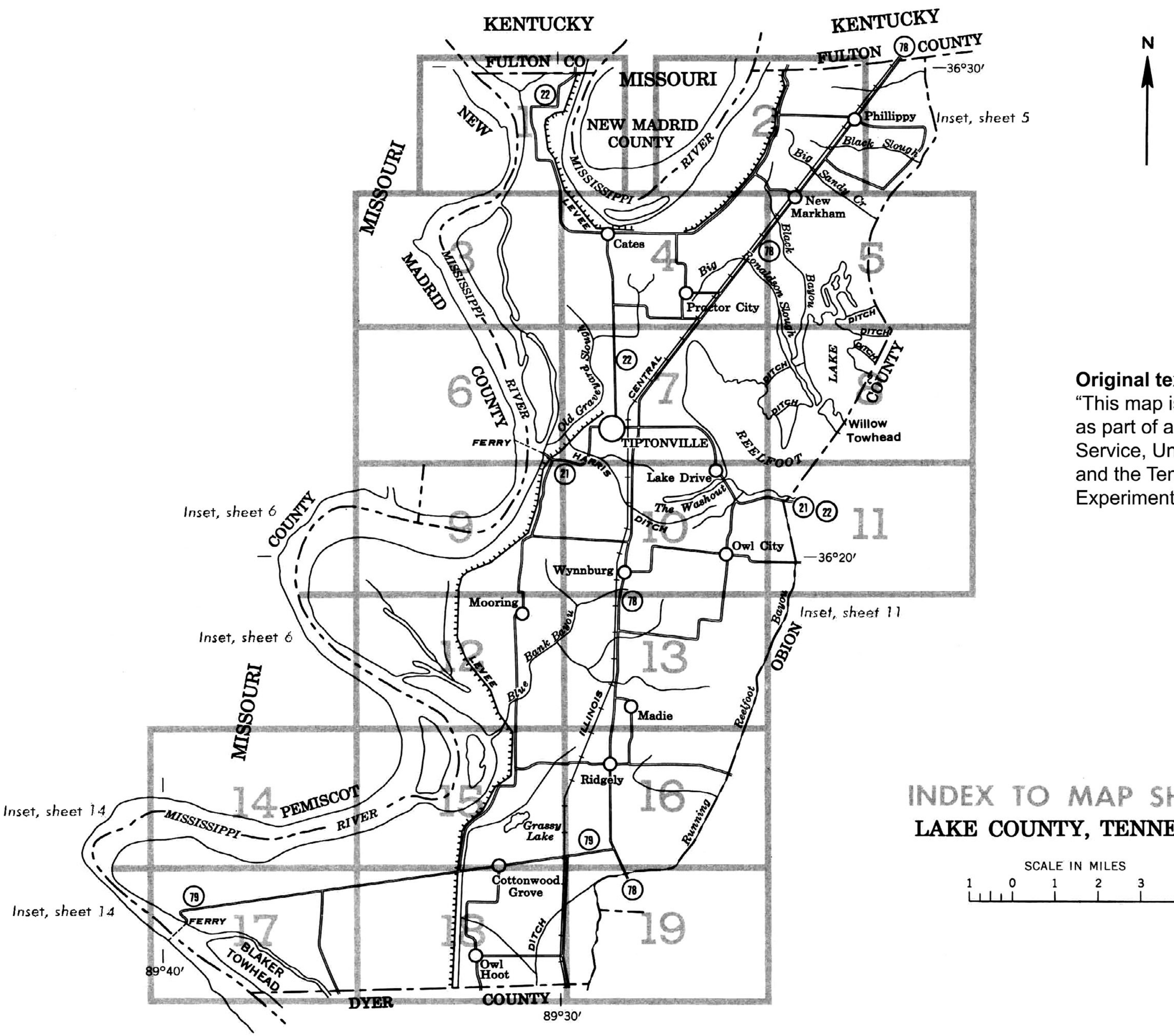
1 0 1 2 3 4



SOIL ASSOCIATIONS

- **1** Commerce-Adler-Robinsonville association: Somewhat poorly drained to well-drained, loamy and silty soils on first bottoms of the Mississippi River
- **2** Reelfoot-Tiptonville-Adler association: Somewhat poorly drained and moderately well drained, silty and loamy soils on high bottoms of the Mississippi River
- **3** Iberia-Sharkey-Bowdre association: Poorly drained and somewhat poorly drained, dark-colored, silty and clayey soils on low, broad flats
- **4** Sharkey-Tunica association: Poorly drained, dark-colored, clayey soils on low flats

April 1969



Original text from each map sheet:
"This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Tennessee Agriculture Agricultural Experiment Station."

INDEX TO MAP SHEETS
LAKE COUNTY, TENNESSEE

SCALE IN MILES
1 0 1 2 3 4

SOIL LEGEND

SYMBOL	NAME
Ad	Adler silt loam
Af	Adler silt loam, frequently flooded
Bo	Bowdre silty clay
Bs	Bowdre silty clay, frequently flooded
Bu	Bruno soils and Alluvial land
Cm	Commerce silt loam
Co	Commerce silt loam, frequently flooded
Cr	Crevasse loamy sand
Ib	Iberia silt loam
Ie	Iberia silty clay loam
Lb	Levees and Borrow Pits
Mh	Mhoon clay
Rb	Reelfoot–Bruno Complex
Re	Reelfoot silt loam
Rf	Reelfoot silty clay loam
Rm	Robinsonville fine sandy loam, frequently flooded
Sa	Sharkey clay
Sw	Swamp
Ta	Tiptonville silt loam
Tc	Tunica clay
Tu	Tunica clay, frequently flooded
Wo	Worthen silt loam

CONVENTIONAL SIGNS

WORKS AND STRUCTURES

Highways and roads
- Dual
- Good motor
- Poor motor
- Trail

Highway markers
- National Interstate
- U. S.
- State or county

Railroads
- Single track
- Multiple track
- Abandoned

Bridges and crossings
- Road
- Trail
- Railroad
- Ferry (FY)
- Ford (FORD)
- Grade
- R. R. over
- R. R. under

Tunnel

Buildings
- School
- Church

Mine and quarry

Gravel pit

Power line

Pipeline

Cemetery

Dams

Levee

Tanks

Sawmill

BOUNDARIES

- National or state
- County
- Reservation
- Land grant
- Small park, cemetery, airport

DRAINAGE

Streams, double-line
- Perennial
- Intermittent

Streams, single-line
- Perennial
- Intermittent
  - Crossable with tillage implements
  - Not crossable with tillage implements
  - Unclassified

Canals and ditches (CANAL)

Lakes and ponds
- Perennial (water, w)
- Intermittent

Spring

Marsh or swamp

Wet spot

Alluvial fan

Drainage end

RELIEF

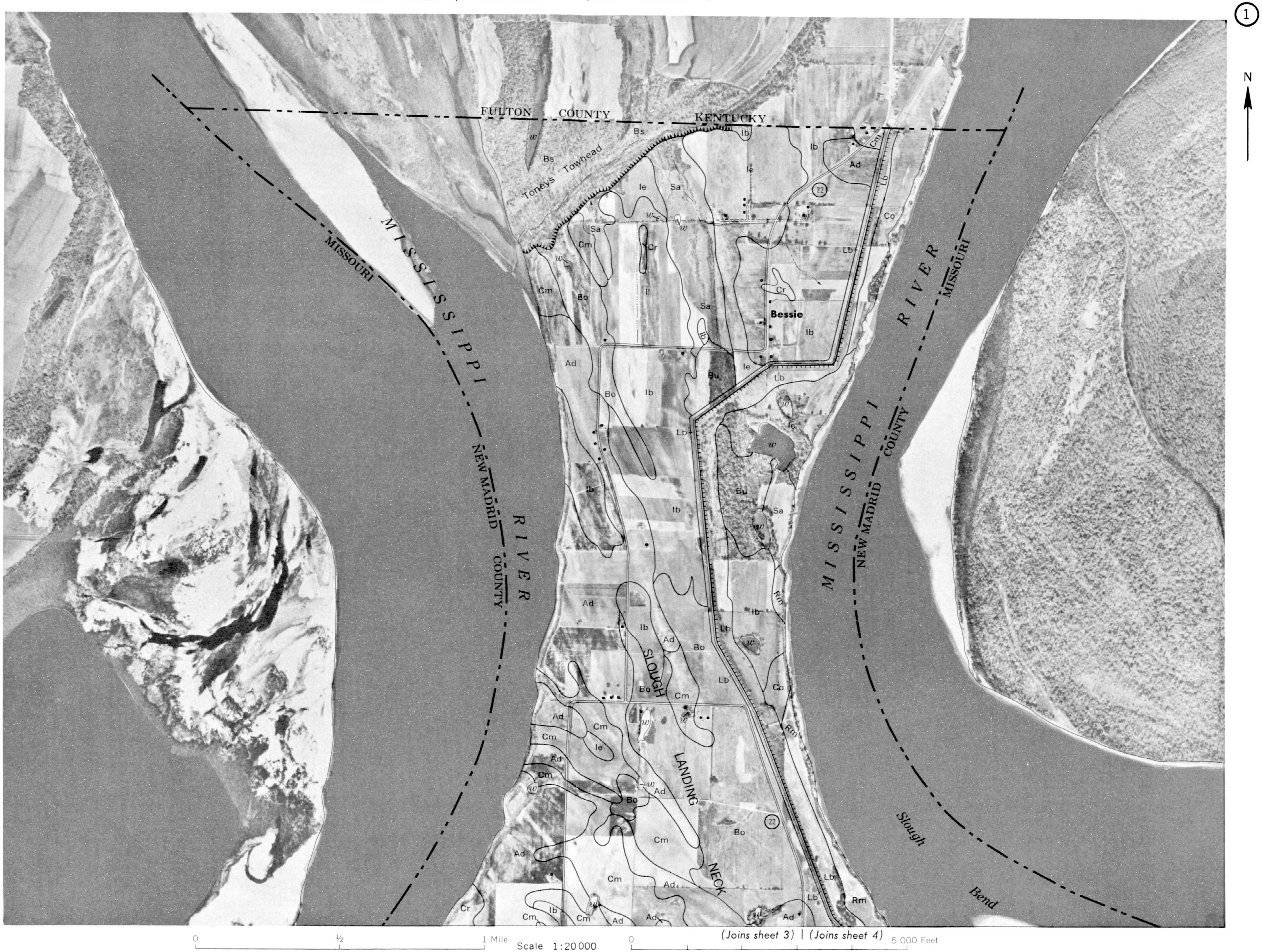
Escarpments
- Bedrock
- Other

SOIL SURVEY DATA

- Soil boundary and symbol (Dx)
- Gravel
- Stoniness
  - Stony
  - Very stony
- Rock outcrops
- Chert fragments
- Clay spot
- Sand spot
- Gumbo or scabby spot
- Made land
- Severely eroded spot
- Blowout, wind erosion
- Gully

Soil map constructed 1968 by Cartographic Division, Soil Conservation Service, USDA, from 1965 aerial photographs. Controlled mosaic based on Tennessee plane coordinate system, State zone, Lambert conformal conic projection, 1927 North American datum.

LAKE COUNTY, TENNESSEE — SHEET NUMBER 1



2

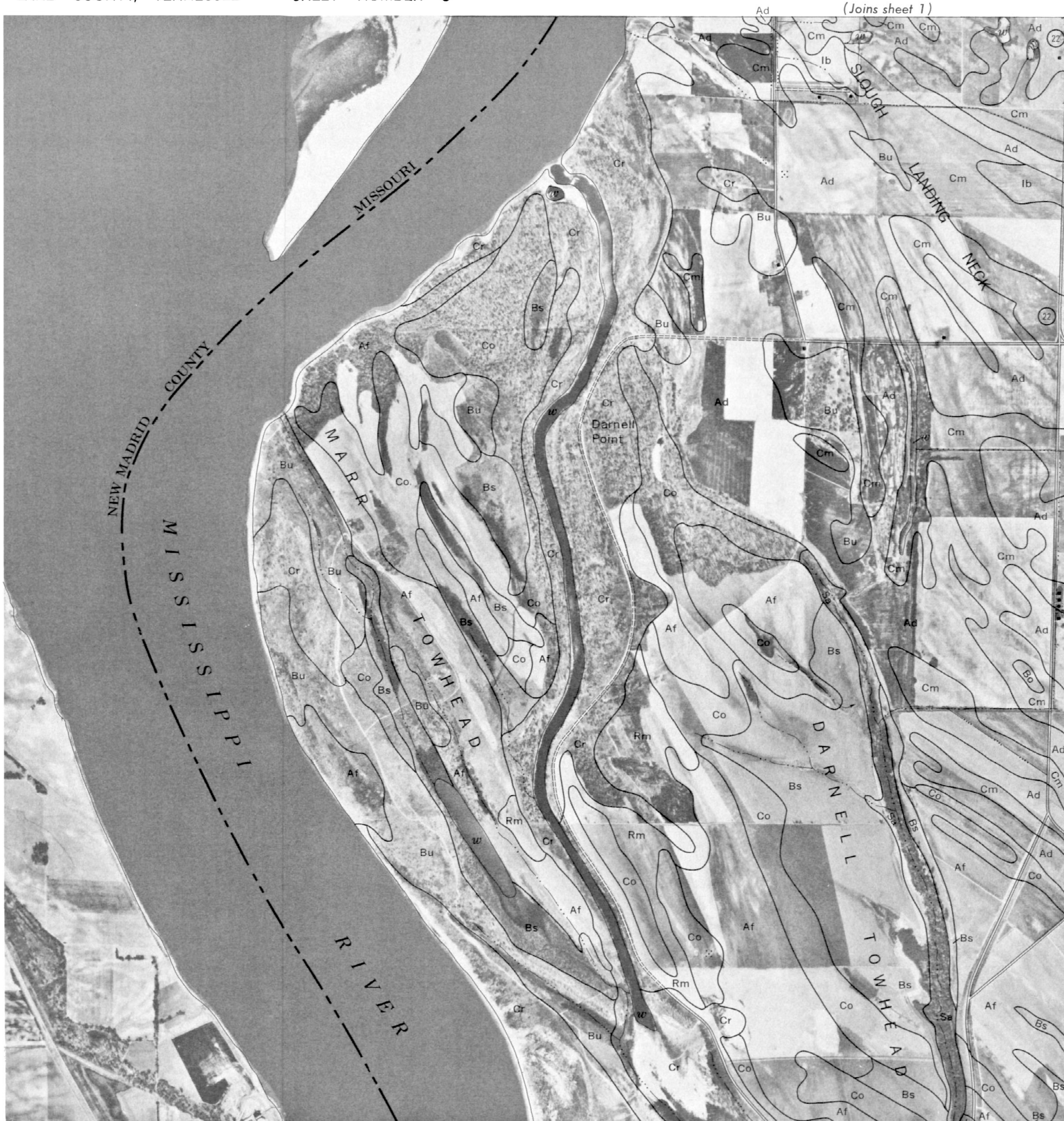
Scale 1:20 000

0 ½ 1 Mile

0 5 000 Feet

3

N



0 ½ 1 Mile Scale 1:20 000 0 5 000 Feet

(Joins sheet 1) | (Joins sheet 2)

(Joins sheet 3)

(Joins sheet 5)

(Joins sheet 7)

0 ½ 1 Mile

Scale 1:20 000

0 5 000 Feet

5

(Joins sheet 2) | (Joins inset)

LAKE COUNTY, TENNESSEE NO. 5

(Joins sheet 4)

(Joins sheet 8)

(Joins sheet 2)

(Joins upper left)

N

0 ½ 1 Mile

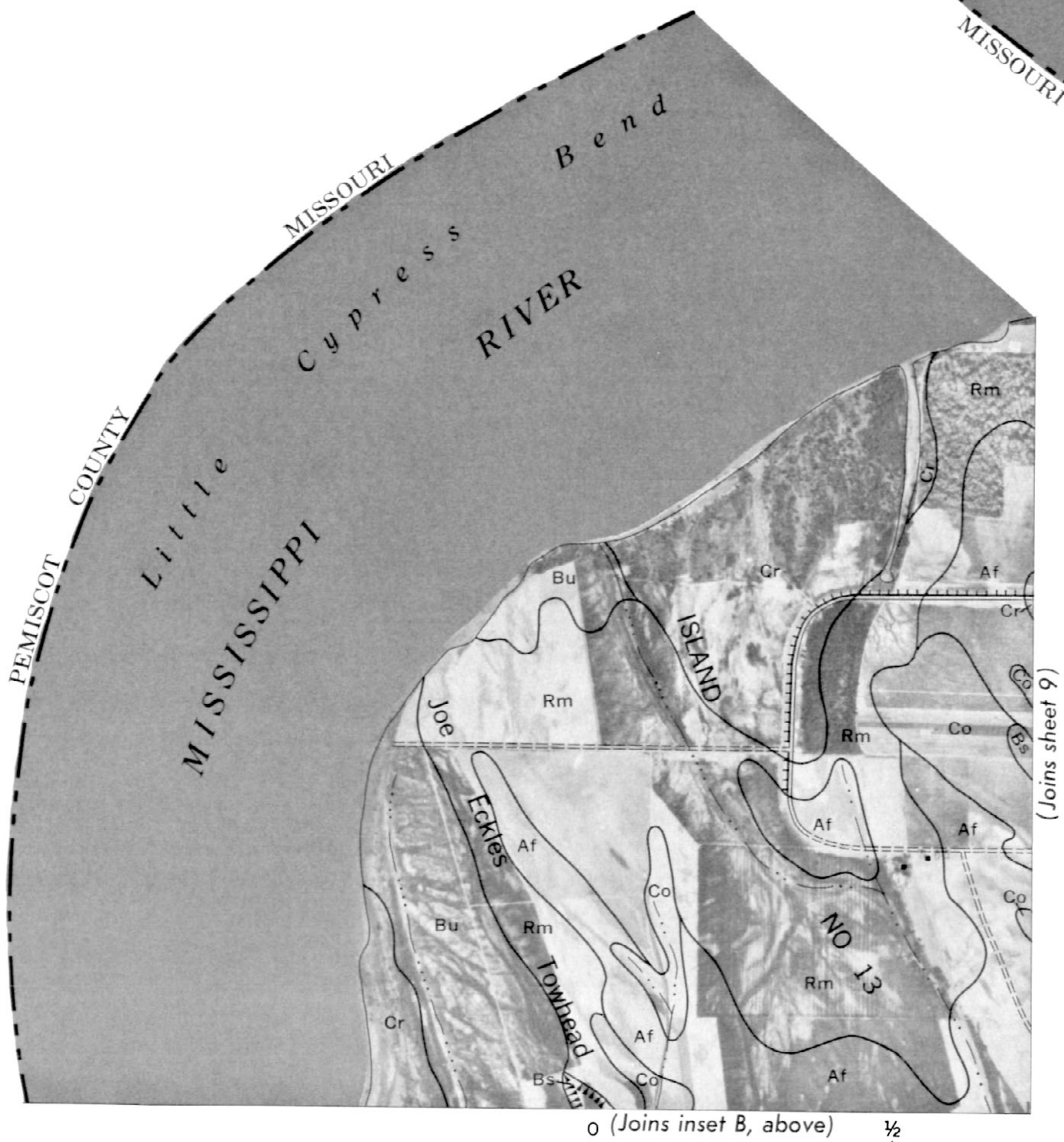
Scale 1:20 000

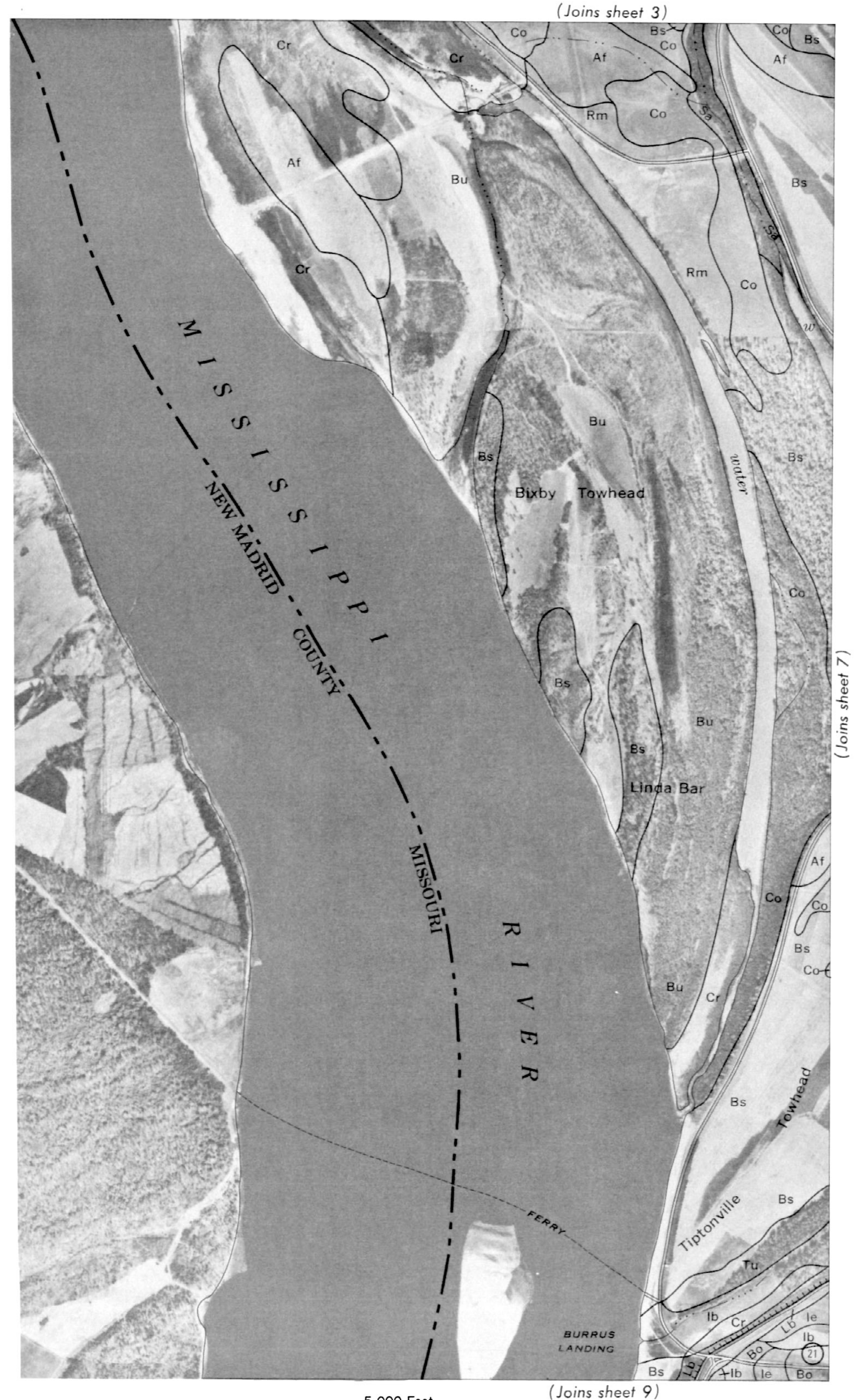
0 5 000 Feet

6

N

LAKE COUNTY, TENNESSEE — SHEET NUMBER 6





0 ½ 1 Mile

Scale 1:20 000

0 5 000 Feet

7

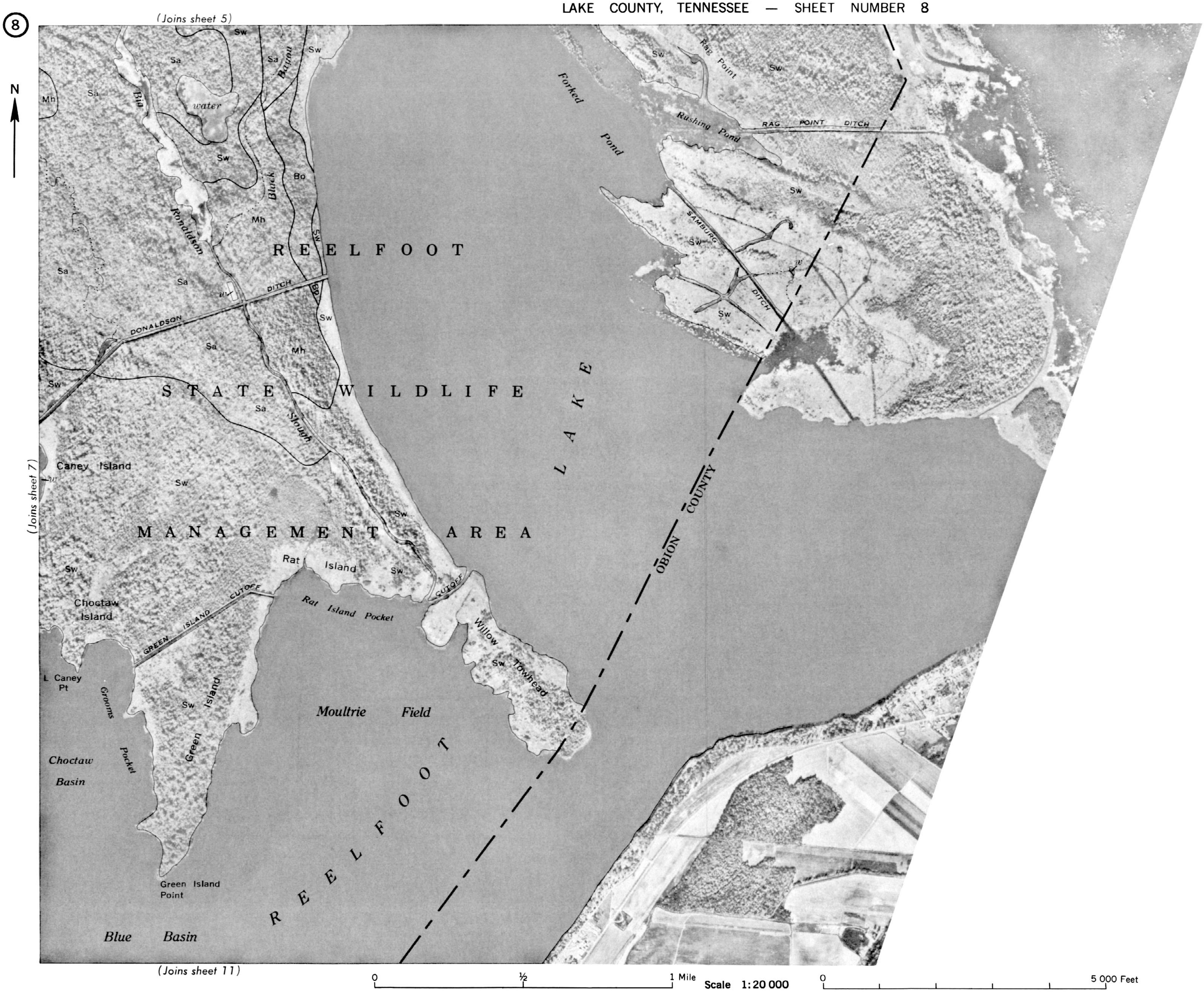
(Joins sheet 4)

(Joins sheet 6)

(Joins sheet 8)

(Joins sheet 10)

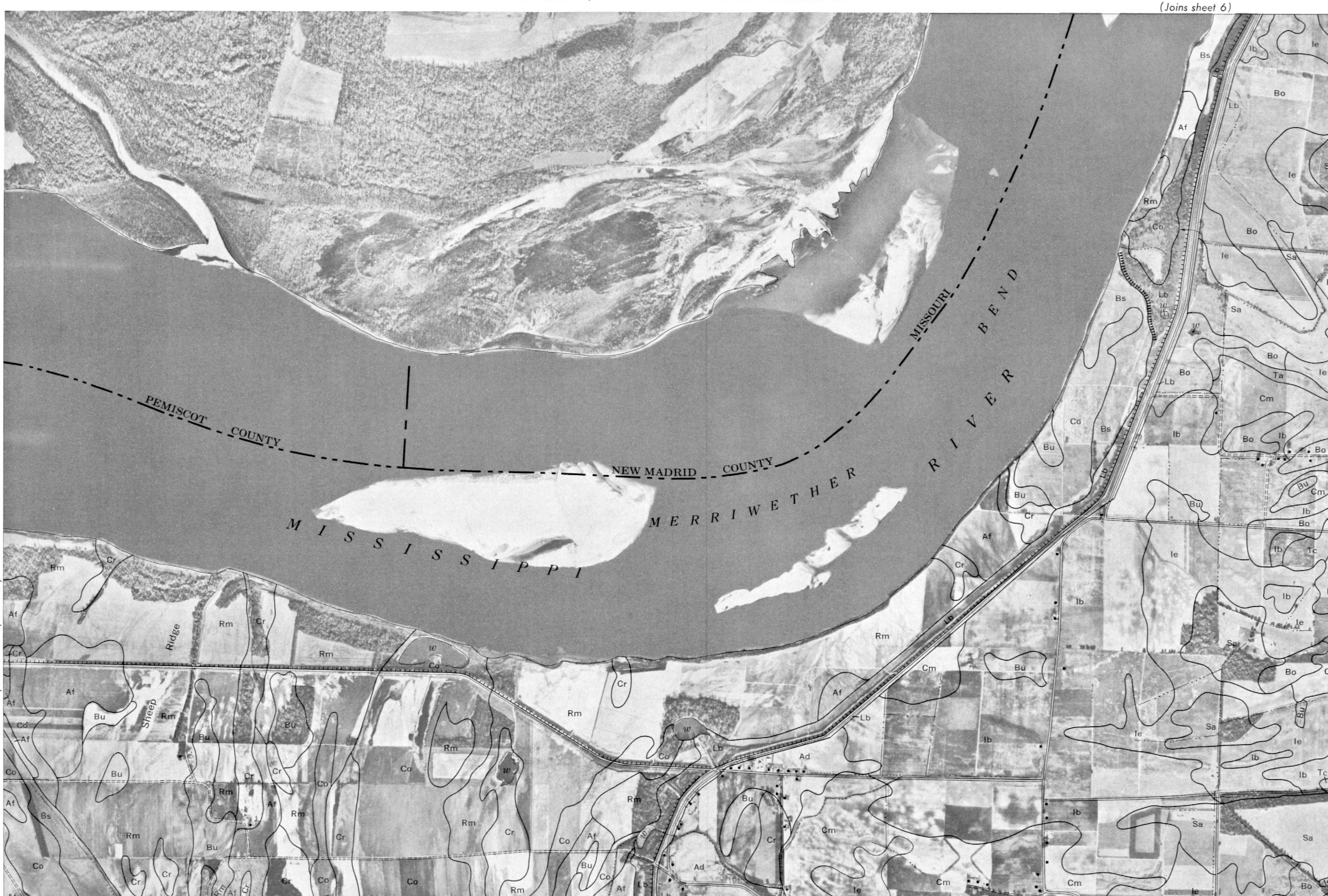
0 ½ 1 Mile Scale 1:20 000 0 5 000 Feet


8
(Joins sheet 5)
N
(Joins sheet 7)
(Joins sheet 11)
REELFOOT STATE WILDLIFE MANAGEMENT AREA
REELFOOT LAKE
REELFOOT
OBION COUNTY
Big Ronaldson Slough
Black Bayou
water
Forked Pond
Rag Point
Rushing Pond
RAG POINT DITCH
SAMBURG DITCH
DONALDSON DITCH
Caney Island
Rat Island
Rat Island Pocket
CUTOFF
GREEN ISLAND CUTOFF
Willow Towhead
Choctaw Island
L Caney Pt
Grooms Pocket
Green Island
Moultrie Field
Choctaw Basin
Green Island Point
Blue Basin
Sa
Sw
Mh
Bo
Bp
w
0
½
1 Mile
Scale 1:20 000
0
5 000 Feet

(Joins sheet 6)

N

(Joins inset A, sheet 6)



(Joins sheet 10)

(Joins sheet 12)

0 ½ 1 Mile **Scale 1:20 000** 0 5 000 Feet

(Joins sheet 7)

(Joins sheet 9)

(Joins sheet 11)

(Joins sheet 13)

0 ½ 1 Mile Scale 1:20 000 0 5 000 Feet

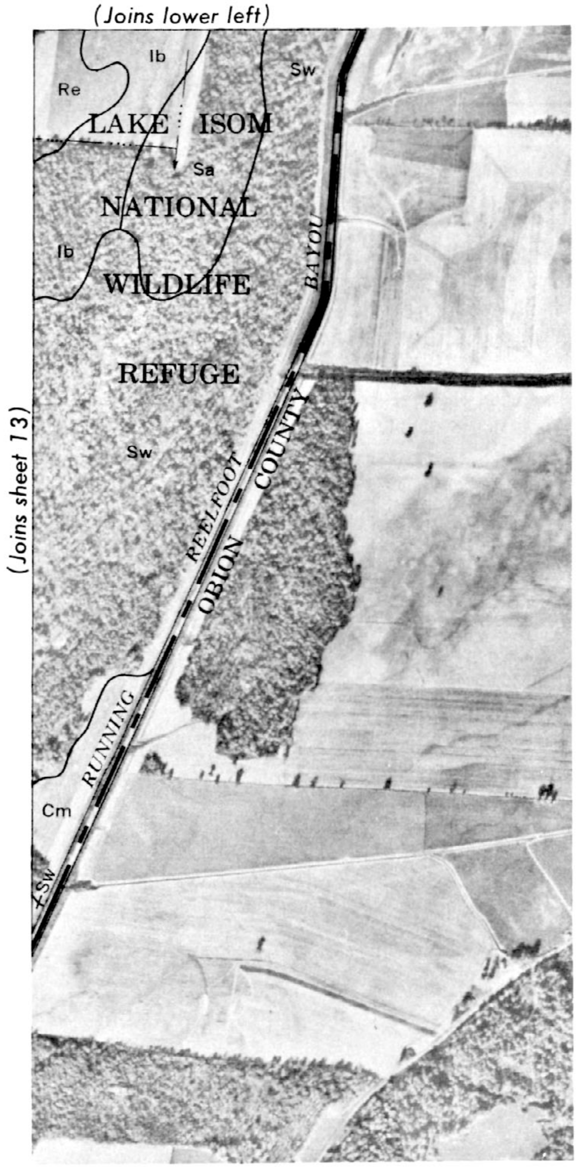
(Joins sheet 8)

(Joins sheet 10)

(Joins inset)

(Joins lower left)

(Joins sheet 13)



N

0 ½ 1 Mile

Scale 1:20 000

0 5 000 Feet

(Joins sheet 9)

(Joins inset B, sheet 6)

(Joins sheet 13)

(Joins sheet 15)

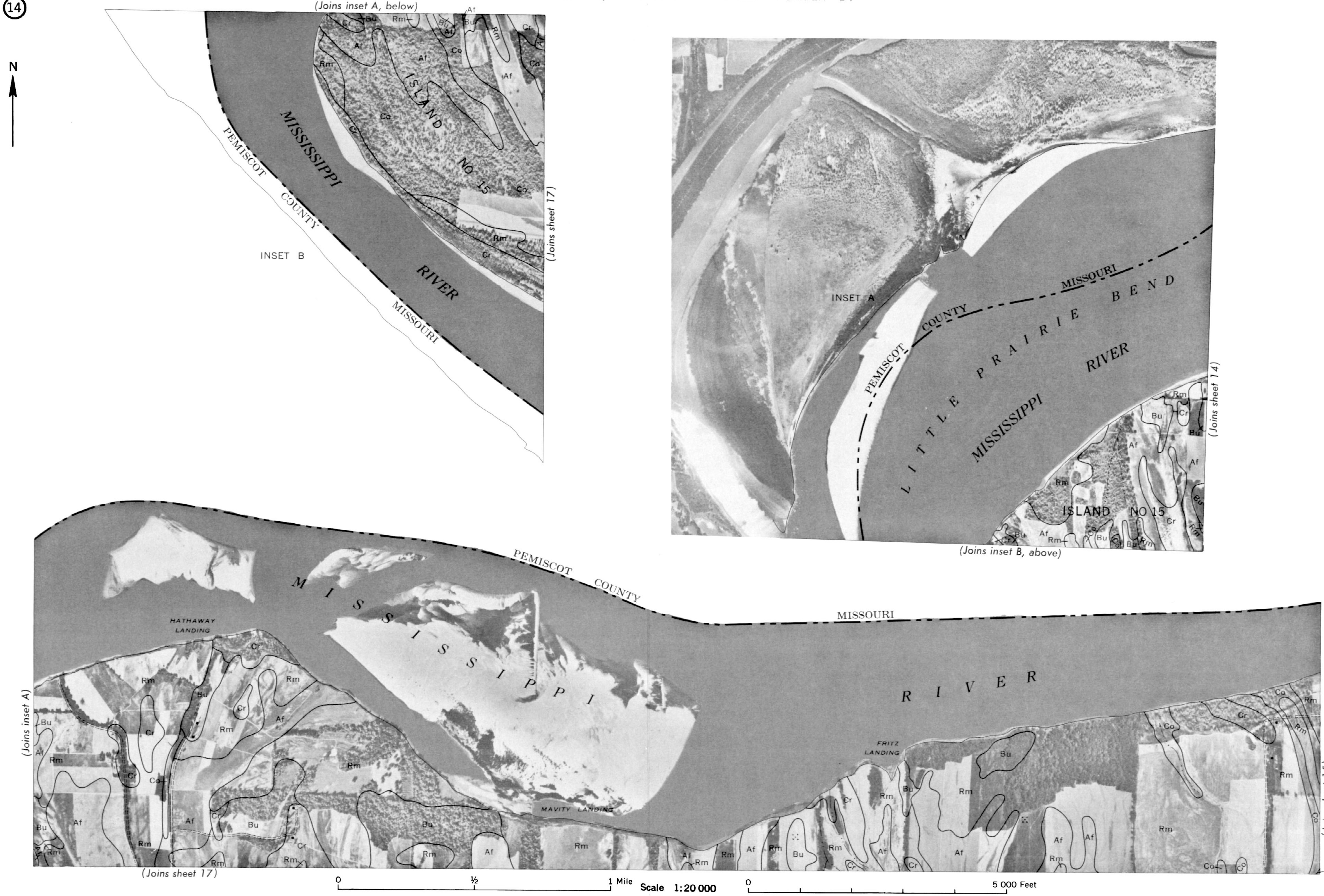
0 ½ 1 Mile **Scale 1:20 000** 0 5 000 Feet

(Joins sheet 10)

13

(Joins sheet 16)

0 ½ 1 Mile Scale 1:20 000 0 5 000 Feet


N
(Joins inset A, below)
MISSISSIPPI RIVER
ISLAND NO 15
PEMISCOT COUNTY
MISSOURI
INSET B
(Joins sheet 17)
INSET A
LITTLE PRAIRIE BEND
MISSISSIPPI RIVER
PEMISCOT COUNTY MISSOURI
ISLAND NO 15
(Joins sheet 14)
(Joins inset B, above)
HATHAWAY LANDING
MISSISSIPPI
PEMISCOT COUNTY
MISSOURI
RIVER
FRITZ LANDING
MAVITY LANDING
(Joins inset A)
(Joins sheet 17)
(Joins sheet 15)
0
½
1 Mile
Scale 1:20 000
0
5 000 Feet

(Joins sheet 12)

15

N

(Joins sheet 14)

(Joins sheet 16)

(Joins sheet 18)

0 ½ 1 Mile Scale 1:20 000 0 5 000 Feet

LAKE COUNTY, TENNESSEE — SHEET NUMBER 16

(Joins sheet 13)

(Joins sheet 15)

(Joins sheet 19)

0 ½ 1 Mile Scale 1:20 000 0 5 000 Feet

0 ½ 1 Mile Scale 1:20 000 0 5 000 Feet

LAKE COUNTY, TENNESSEE — SHEET NUMBER 18

(Joins sheet 15)

(Joins sheet 17)

(Joins sheet 19)

DYER COUNTY

0 ½ 1 Mile Scale 1:20 000 0 5 000 Feet

(Joins sheet 16)

0 ½ 1 Mile **Scale 1:20 000** 0 5 000 Feet